FORT WAINWRIGHT, ALASKA

(INCLUDING THE YUKON COMMAND TRAINING SITE AND THE FAIRBANKS PERMAFROST STATION)

TERRAIN ANALYSIS

PREPARED BY
DEFENSE MAPPING AGENCY HYDROGRAPHIC/TOPOGRAPHIC CENTER
WASHINGTON, D.C.
FOR
THE TERRAIN ANALYSIS CENTER
U.S. ARMY ENGINEER TOPOGRAPHIC LABORATORIES
FORT BELVOIR, VIRGINIA 22060

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(INCLUDING THE YUKON COMMAND TRAINING SITE AND THE FAIRBANKS PERMAFROST STATION)

TERRAIN ANALYSIS

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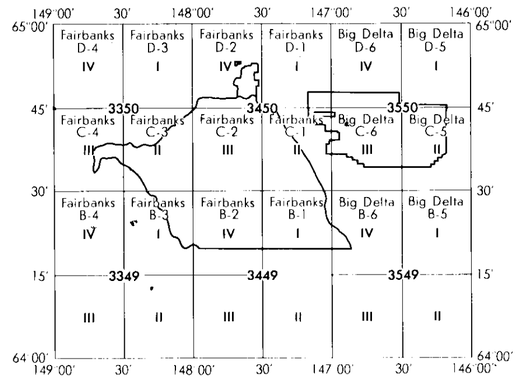

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I. INTRODUCTION

BACKGROUND

The requirement for this terrain analysis of Fort Wainwright was stated in message P241854Z, Oct. 75, from the Commander, FORSCOM to the Office Chief of Engineers (OCE), Department of Army, subject: "Terrain Analysis of Selected FORSCOM Installations." The FORSCOM requirement identified 13 installations (later amended to include a total of 17) including Fort Wainwright, and cited topical coverage to be included in the studies. Responsibility for management and supervision of the program developed in response to the FORSCOM requirement was assigned by OCE to the Terrain Analysis Center (TAC), U.S. Army Engineer Topographic Laboratories. At FORSCOM request, TAC responsibility also includes technical supervision and direction of FORSCOM troop units assigned to the program.

Scope and content of the topical coverage included in the FORSCOM requirement were developed jointly between representatives of TAC and FORSCOM Headquarters.

This study was prepared by the Defense Mapping Agency Topographic Center, Washington D.C. under the direction of the Terrain Analysis Center (TAC) of the U.S. Army Engineer Topographic Laboratories (ETL), Fort Belvoir, Virginia.

PURPOSE

In stating the requirement for terrain analyses of selected installations, FORSCOM indicated that the purpose of the program is to assist military planners in future stationing decisions. To achieve this purpose, planners must obtain an appreciation of the on-post terrain that includes among many other things, knowledge of the suitability for conducting field training exercises involving maneuverability of troops and military vehicles. The degree of maneuverability that can be achieved is a function of several terrain factors including slope, surface configuration, soils, vegetative cover, and surface drainage, all of which are treated in the studies.

Planners concerned with troop stationing also need certain off-post information such as statistics on housing, schools, hospitals, and public utilities in urban areas near installations, as well as pertinent data on airfields and ports in the vicinity. These things are also treated in the studies.

Since the program under which this study was prepared is intended to serve troop stationing requirements, the support provided by the program to environmental requirements is only incidental. While some of the information contained in the studies may be useful as environmental base line data, the studies are by no means complete environmental inventories of the kind required in support of environmental impact assessments.

SCOPE

In scope, the terrain analysis is a compendium of available data on the pertinent natural and man-made features of the reservation and an evaluation of their effects on tactical military operations. The program does not include basic research to fill gaps in these data, although some short-term field investigations were performed to obtain ground truth and a general overall appreciation of terrain elements. Therefore, the scope of the analysis is limited primarily to those factors which have been documented by other authorities and to the results of analysis and evaluation of those factors by senior terrain analysts for topics such as cross-country movement, cover and concealment and water resources.

The terrain analysis preparation process has necessarily involved analytical judgement in the selection of pertinent source data, resolution of data conflicts, recognition of interrelationships not previously made explicit, and the application of remote sensing to update certain critical, time-variant data such as vegetative cover and man-made features including roads, airfields, and facilities constructed outside of the cantonment areas.

LIMITATIONS

The study naturally reflects limitations in the quality, amount, and currency of the source data on which it is based. Numerous field interviews and selective use of remote sensing were employed in an effort to assure presentation of the latest and best information. Within the relatively complex topical scope of the analysis, however, there are a number of aspects on which source data have not been generated with the focus or recency desired to meet objectives fully. As noted under Scope, the study effort was not designed to include basic research as a means of filling gaps in data.

By design, the presentation is cast at a level of data coverage consistent with stated objectives. Users interested in deeper pursuit of data are referred to the List of Sources in the back of the study.

PRESENTATION

Maximum use of graphic presentation has been made throughout the terrain analysis. Supporting text is, as far as practicable, in tabular format keyed to the related graphics which follow. The primary map scale is 1:125,000. For Urban Areas (Cantonment Areas) the scale of the map is 1:4,800 and Off-Post Features the map scale is 1:500,000.

STUDY AREA

The Fort Wainwright Military Complex encompases three facilities totalling 373,459 hectares (922,805 acres): Fort Wainwright (formerly Ladd Air Force Base), the Yukon Command Training Site, and the Fairbanks Permafrost Station (Lease No. 567-20).

Fort Wainwright consists of 269,804 hectares (666,676 acres) in the Tanana-Kuskokwim Lowlands of Central Alaska, adjacent to the city of Fairbanks. The Tanana River divides the main reservation into a northern portion which includes the Fort Wainwright Cantonment Area, and a southern portion which is utilized for military training.

The two subordinate facilities of the complex are not contiguous to Fort Wainwright proper, but are nearby. The Yukon Command Training Site, covering 103,602 hectares (255,996 acres), is southeast of the Fort Wainwright Cantonment Area, east of the Tanana River and adjacent to Eielson Air Force Base. The Yukon Command Training Site is presently under the control of the Bureau of Land Management (BLM) and is used for military training under an agreement with the BLM. The Fairbanks Permafrost Station ("Farmers Loop Road Research Station") consists of 54 hectares (133 acres) within the city of Fairbanks, on Farmers Loop Road northwest of Fort Wainwright. This parcel of land is a research and storage area for the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) Alaskan Projects Office, headquartered on Fort Wainwright.

Landforms consist of generally flat lowlands on Fort Wainwright to rolling uplands on the Yukon Command Training Site. Elevations range from 111 to 429 meters (365 to 1407 feet) on Fort Wainwright and from 160 to 995 meters (525 to 3264 feet) on the Yukon Command Training Site. The vegetation on Fort Wainwright differs from that on the Yukon Command Training Site. Approximately 64 percent of Fort Wainwright is covered with deciduous scrub/high brush; approximately 91 percent of the Yukon Command Training Site consists of mixed evergreen needleleaf and deciduous broadleaf trees. During the winter months the region is snow covered and most of the streams freeze solid, leaving the Tanana River, Wood River, Chena River and the Salchaket Slough on Fort Wainwright as the only streams that maintain flow throughout the year.

Snowfall averages 162.3 centimeters (63.9 inches) per year. The winters in the Fort Wainwright area are characterized by relatively calm, clear weather, and a high frequency (80 percent) of surface temperature inversions. High winter pollution potentials result in ice-fog formation, which creates serious visibility problems.

II. DESCRIPTION AND MILITARY ASPECTS OF TERRAIN

A. SURFACE CONFIGURATION

Fort Wainwright, on the Tanana-Kuskokwim Lowland, and the Yukon Command Training Site, on the Yukon-Tanana Upland, are in two distinct physiographic sections. The surface configuration changes from the generally flat lowlands of Fort Wainwright to the rolling uplands of the Yukon Command Training Site. Flat plains predominate on Fort Wainwright, although there are a few widely scattered higher plains and hill groups south of the Tanana River; Birch Hill is the only upland north of the Tanana River. Elevations on Fort Wainwright range from a low of 111 meters (365 feet) above sea level at the extreme western edge of the reservation to 429 meters (1407 feet) on the small hill in the southeast near Blair Lakes. The portion of the Yukon-Tanana Upland southeast of the Fort Wainwright cantonment area is comprised mainly of high rounded hills interspersed with lower hills and valley lowlands. Elevations range from 160 meters (525 feet) above sea level on the flat plain of the Chena River to 995 meters (3264 feet) on a hilltop in the east-central part of the Yukon Command Training Site.

MAP UNIT	LANDFORM TYPE	LANDFORM DESCRIPTION AND DISTRIBUTION	ELEVATIONS
1	LOW PLAINS	Flat to gently rolling surfaces cover about 94 percent of Fort Wainwright. Flat surfaces, containing numerous meander and slough scars, shallow swales, and wide, basin-like depressions, dominate the northern two-thirds of these plains; slopes are mainly less than 1 percent and the local relief less than 5 meters (16 feet). Surfaces become more gently rolling with fewer scars and depressions in the southern third of these plains where the Lowlands begin approaching the Alaska Range; slopes are commonly less than 3 percent; local relief is generally less than 10 meters (32 feet). On the Yukon Command Training Site, about 20 percent of the area is comprised of flat to gently rolling plains; surfaces are flattest, generally less than 3 percent slope and with local relief less than 35 meters (115 feet), in the northwestern and southwestern corners; elsewhere, narrow, flat to gently rolling valley floors predominate.	Elevations are largely between 122 and 244 meters (400 and 800 feet) above sea level on Fort Wainwright; the lowest elevation, 111 meters (365 feet), is along the Tanana River in the extreme western portion and the highest is 290 meters (950 feet) nearly on the southern boundary southeast of Blair Lakes. On the Yukon Command Training Site, elevations are mainly between 183 and 305 meters (600 and 1000 feet) above sea level; the lowest elevation, in the northwest along the Chena River, is 160 meters (525 feet) and the highest, 396 meters (1300 feet), in an upper stream valley in the southeast.
2	HIGH PLAINS	Smooth to moderately dissected, rolling and hillocky surfaces encompass 3 percent of Fort Wainwright in the Wood River Butte, Clear Creek Butte and Blair Lakes areas; slopes are generally between 10 and 30 percent; local relief is generally between 107 and 150 meters (350 and 492 feet) in central and southeastern Fort Wainwright and up to 138 meters (451 feet) in the southwestern portion. Gently rolling to rolling surfaces along the sides of stream valleys within the Yukon Command Training Site cover approximately 10 percent of this area; slopes are largely between 3 and 15 percent with some over 15 percent reaching to 45 percent; local relief is between 50 and 150 meters (164 and 492 feet).	Elevations are largely between 274 and 381 meters (900 and 1250 feet). The lowest elevation is 152 meters (500 feet) above sea level at Clear Creek Butte and the highest is 416 meters (1365 feet) in the Blair Lakes area. The lowest elevation on the Yukon Command Training Site is 180 meters (590 feet) east of Eielson AFB and the highest is 425 meters (1394 feet) near Pine Creek.
3	LOW HILLS	Rounded, low hills with smooth to moderately dissected surfaces of the Blair Lakes area and Birch Hill protrude above the flat plain in the southeastern and extreme northern parts of Fort Wainwright and cover about 3 percent of the reservation; slopes are largely between 10 and 30 percent with a few reaching 45 percent; local relief ranges from 157 meters (515 feet) to 215 meters (706 feet). On the Yukon Command Training Site, low, rounded to flat-topped hills with smooth to moderately dissected surfaces cover approximately 30 percent of the area; some rock outcrops in the north-central area; slopes are largely between 15 and 30 percent with several large areas from 30 to 45 percent and 8 to 15 percent; local relief ranges from 150 to 300 meters (492 to 984 feet).	Elevations on Fort Wainwright are largely between 229 and 381 meters (750 and 1250 feet) above sea level in the southeast and 151 and 274 meters (500 and 900 feet) in the north; the lowest elevation, 137 meters (450 feet), is at the base of Birch Hill and the highest, 429 meters (1407 feet), is in the Blair Lakes area. On the Yukon Command Training Site, the lowest elevation is 191 meters (625 feet) and the highest elevation is 716 meters (2350 feet) east of Hunts Creek.
4	HIGH HILLS	Moderately dissected, rounded to flat-topped high hills dominate the central and eastern portions of the Yukon Command Training Site and cover approximately 40 percent of the Site. Ridges oriented northeast to east. Some isolated rock outcrops occur in the eastern part. Slopes are largely between 30 and 45 percent with large areas of 15 to 30 percent and smaller areas greater than 45 percent. Local relief is generally between 300 meters (984 feet) and 400 meters (1312 feet), rising to 534 meters (1750 feet) in the extreme eastern part.	Elevations range from 244 meters (800 feet) adjacent to French Creek to 995 meters (3264 feet) near the eastern boundary of the Yukon Command Training Site.

B. SURFACE DRAINAGE

All the surface drainage on Fort Wainwright flows into the Tanana River. This stream is a major tributary of the Yukon River and joins it about 300 kilometers (180 miles) to the west. South of the Tanana River, most drainage flows northwestward directly to that river or into Salchaket Slough, a side channel of the Tanana. The Wood River forms the western boundary and also flows northwestward. North of the Tanana River, the Chena River, a major tributary, flows westward into the Tanana, passing through the cantonment area. It also passes just north of the Yukon Command Training Site and drains about half of it. Drainage from the other half flows westward, directly to the Tanana, except for a small area in the southeast corner of the Training Site, which discharges southward into the westward flowing Salcha River.

There is a noticeable difference in average stream discharges between the Chena River and the Tanana and Wood Rivers. The Chena River is fed by runoff from local uplands mostly to the north and east of Fort Wainwright. It's heaviest discharge usually occurs in May, when rapid spring snowmelt drains across still frozen, largely impermeable ground, often causing serious flooding problems. The Tanana River and to an even larger extent the Wood River, receive much of their discharge from glacial meltwater. Here the spring snowmelt increases discharges appreciably, but the heaviest discharges occur in July and August from increased summer rainfall and glacial meltwater flowing northward out of the Alaska Range.

The severe cold of Fort Wainwright winters causes the shallow streams and lakes to freeze to the bottom. Ice may be over 1 meter (3 feet) thick. Of the reservation streams, only the Tanana, Chena, and Wood Rivers and Salchaket Slough can generally be expected to flow the year around. Winter streamflow is supplied principally from groundwater. Ice may start forming in October and generally breaks up in May.

Flooding has been a problem in the past, particularly from the Chena River, but also, occasionally from the Tanana River. The Cantonment area has been flooded, as have low areas on the south side of the Tanana River. Two flood control dams have been built in the Chena River watershed and a 3.8 meters (12.5 feet) average height levee has been constructed along the north bank of the Tanana River to protect the cantonment area and Fairbanks. Flooding may occur from May through early September. The May floods generally are caused by rapid snowmelt and the breakup of ice jams, while summer flooding is usually from heavy rainstorm activity.

B. SURFACE DRAINAGE (Continued)

DRAINAGE CHARACTERISTICS

DRAINAGE CATEGORIES	GENERAL	REGIME	WIDTHS	DEPTHS	VELOCITY AND DISCHARGE	BANKS	BOTTOMS
Watercourses							
Tanana River	Major perennial stream flowing generally westward through the north side of a wide valley. Terrain is generally flat south of the river and contains rolling uplands to the north. Stream is heavily oraided, particularly upstream from Fairbanks and meandering on the downstream side.	High water, June through early September. Low water, January through March. Surface frozen from about late October to mid-May. Flooding can occur from May through September, particularly on south side of river.	Upstream of Fairbanks, from about 0.5 to 1.5 km (0.3 to 0.9 mi) bank to bank. Water widths may be far less as stream is heavily braided here. Downstream of Fairbanks, river is less braided, generally ranges from about 0.3 to 0.5 km (0.2 to 0.3 mi) bank to bank.	Upstream of Fairbanks, from about 0.3 to 1.6 m (1 to 5 ft) at low water and up to about 3.7 m (12 ft) at high water. Below Fairbanks, up to about 2 m (6 ft) at low water and 5.5 m (18 ft) at high water.	Velocity is estimated at 1 to 2 m/sec (3 to 6 ft/sec) during low water. At the Fairbanks gage, the maximum discharge for the period of record (1973–1977) is 1930 m^3/sec (68,300 ft^3/sec) on 22 July 1975 and the minimum daily is 88 m^3/sec (3100 ft^3/sec) from 14 February to 31 March 1974. Estimated maximum discharge for flood of 16 August 1967 is 3500 m^3/sec (125,000 ft^3/sec). See tables below for mean discharge figures.	Mostly sand and gravel with 0.3 m (1 ft) or more of silt as a top layer. Slopes generally greater than 60%, except more gradual on inside of bends. Heights usually about 1 to 1.6 m (3 to 5 ft) upstream of Fairbanks and and 2 to 3 m (6 to 9 ft) downstream.	Mostly gravel with some sand.
Chena River	Large perennial stream meanders westward in a wide valley, passing through the cantonment area and adjacent to the northwest corner of the Training Site. Muskegoreas near river in Training Site.	High water, May through September. Low water, January through March. Surface frozen from about late October to May. Flooding can occur from May through September, but most floods occur in May.	Ranges from about 90 to 120 m (300 to 400 ft) through cantonment. Maintained by dredging and bank erosion control.	Maintained at about 1.6 m (5 ft) by dredging.	Velocity is estimated at 0.5 to 0.7 m/sec (1.5 to 2.3 ft/sec) during low water. At the Fairbanks gage, the maximum discharge for the period of record (1948-1976) is 2110 m^3/sec (74,400 ft^3/sec) on 15 August 1967 and the minimum daily is 3.4 m^3/sec (120 ft^3/sec) in February 1953 and March 1958. See tables below for mean discharge figures.	Mostly sand and gravel with a top layer of silt. In some places, a gravel and rock liner has been applied. Slopes generally about 45% to vertical. Heights about 3.5 to 5 m (11 to 15 ft).	Gravel and sand with some silt.
Wood River	Perennial stream flows northwestward to the Tanana River across the southern side of the Tanana River valley. Terrain is generally flat and stream is braided through an alluvial outwash in its upper reaches and meandering through the Tanana floodplain in its lower reaches	High water, June through August. Low water, December through April. Surface frozen from about late October to May. Flooding seldom occurs.	In the lower reaches, about 60 to 90 m (200 to 300 ft) bank to bank. In the upper reaches to the southern reservation boundary, about 245 to 275 m (800 to 900 ft).	In lower reaches, averages about 1 m (3 ft) at low water and 1.5 m (5 ft) at high water. In upper reaches, the low water averages are about 0.3 m (1 ft) and high water, about 0.6 m (2 ft).	In the lower reaches, velocity is estimated at about 0.15 m/sec (0.5 ft/sec) at low water to between 0.15 and 0.6 m/sec (0.5 and 2 ft/sec) in the upper reaches. At the gage near Fairbanks, the maximum discharge for the period of record (1968–1976) is 156 m^3/sec (5510 ft^3/sec) on 13 August 1976 and the minimum daily is 1.4 m^3/sec (50 ft^3/sec) on 16 December 1975 to 15 April 1976. See tables for mean discharge figures.	Mostly sand and gravel in upper reaches. Increasingly thick top layer of silt downstream to mostly silt in lower reaches. Slopes about 30% to vertical in upper reaches to mostly vertical in lower reaches. Heights about 0.3 to 0.6 m (1 to 2 ft) in upper reaches to 0.6 to 1.3 m (2 to 4 ft) in lower reaches.	Gravel and sand with some silt in lower reaches.
Salchaket Slough	Perennial side channel of the Tanana River. Meanders westward across the Tanana floodplain on the south side of the river. Muskeg areas adjacent to stream particularly on downstream half.	High water, June through early September. Low water, January through March. Surface frozen from about late October to mid-May. Flooding can occur from May through September.	Averages about 60 m (200 ft) bank to bank.	About 1.5 to 2 m (4 to 6 ft) at low water.	Velocity is estimated at 0.5 to 2 m/sec (1.5 to 6 ft/sec) at low water. Average discharge for high water months is about 90 m^3/sec (3200 ft^3/sec) or about 8% of Tanana River flow	Mostly silt with lenses and pockets of sand and gravel. Slopes from about 45% to vertical, mostly near vertical. Heights about 1 to 1.3 m (3 to 4 ft).	Gravel, sand and silt.
Dry Creek	Perennial stream flows northwestward into Clear Creek. Stream flows out of Alaska Range across an alluvial outwash in braided channel.	High water, July and August. Surface frozen from about late October to mid-May and frozen to bottom from about December through April. Little or no flooding.	Ranges from about 18 to 60 m (60 to 200 ft) bank to bank. Water width is generaly considerably less.	Averages about 0.3 m (1 ft) at low water and may double at high water.	Average velocity estimated to be 0.3 to 0.6 m/sec (1 to 2 ft/sec) at normal water and discharge between 2 and 3 m^3/sec (70 and 100 ft^3/sec).	Mostly gravel and sand with a thin top layer of silt. Slopes very low to vertical. Heights from about 0.3 to 0.6 m (1 to 2 ft).	Mostly gravel with sand and some silt.
Other Streams (Fort Wainwright)	Perennial streams meandering northwestward across the south side of the Tanana River floodplain to the Tanana River or Salchaket Slough. Muskeg and some marshy areas adjacent to streams, particularly in lower reaches	High water, July and August. Surface frozen from about late October to mid-May and frozen to bottom from about January through April. Little flooding, except from Tanana River backwater.	Clear and Willow Creeks up to about 15 m (50 ft) bank to bank. Crooked Creek up to about 12 m (40 ft). Other streams considerably narrower.	Crooked Creek up to about 0.6 m (2 ft); Clear and Willow Creeks up to about 1 m (3 ft). Others generally less than 0.6 m (2 ft). Depths estimated at low water and may double during high water.	Average velocities for Clear, Willow and Crooked Creeks about 0.3 m/sec (1 ft/sec) and discharges about 4 to 6 m^3/sec (150 to 200 ft^3/sec). Figures estimated at normal water.	Clear, Willow and Crooked Creeks mostly gravel and sand near headwaters grading to silt near mouths. Slopes from about 45% to vertical. Heights about 0.6 to 1 m (2 to 3 ft). Most other streams are similar with slightly lower bank heights.	Mostly gravel and sand with some silt in upper reaches and silt and sand in lower reaches.
South Fork Chena River	Perennial stream meanders through a fairly narrow valley surrounded by moderately dissected hills. Stream flows generally northwestward across the northeast part of the Yukon Command Training Site to meet the Chena River off-post.	High Water, May through August. Surface frozen from about late October to mid-May and frozen to bottom from about December through April. Flooding seldom a problem.	Lower reaches average about 9 to 12 m (30 ft to 40 ft) bank to bank. Upper reaches, about 6.7 to 9 m (20 to 30 ft).	Generally ranges between 0.3 and 0.6 m (1 and 2 ft) in lower reaches and less than 0.3 m (1 ft) in upper reaches.	Velocities estimated at about 0.15 to 0.45 m/sec (0.5 to 1.5 ft/sec) at normal water. Discharge estimated at about 6 m^3/sec (200 ft^3/sec).	Gravel and sand with thin layer of silt on top. Slopes from about 30% to vertical. Heights in upper reaches, about 0.3 to 0.6 m (1 to 2ft) and in lower reaches, about 0.3 to 1 m (1 to 3 ft).	Sand and gravel with some silt.
Other Streams (Yukon Command Training Site)	Perennial streams mostly originating on-post as straight flowing streams in narrow steep sided valleys and leaving the reservation to the north, west and south as meandering streams in fairly narrow valleys.	High water, May through August. Surface frozen from about late October to mid-May and frozen to bottom from about December through April. Flooding seldom a problem except occasionally on lower reaches of Moose and French Creeks.	Moose and French Creeks average about 6 m (20 ft) bank to bank at boundary; Ninety-eight Creek about 8 m (25 ft); others up to about 3 m (10 ft) at boundary or at mouth of stream.	Moose, French and Ninety-eight Creeks average up to about 0.6 m (2 ft) at normal water; others generally less than 0.3 (1 ft). Averages estimated at boundary or mouth of stream and decrease toward headwaters.	Velocities estimated at about 0.15 to 0.45 m/sec (0.5 to 1.5 ft/sec) at normal water. Discharges for Moose, French and Ninety-eight Creeks estimated at about 3 m^3/sec (100 ft^3/sec); others about 0.7 m^3/sec (25 ft^3/sec). Discharges may more than double in high water.	Moose and French Creeks mostly silt in lower reaches to gravel with thin silt top layer in upper reaches. Horner and Hunts Creeks mostly gravel with silt on top. Others mostly sand and gravel with silt on top. Moose and French Creek slopes about 60% to vertical in lower reaches and 30 to 60% in upper reaches; others about 30% vertical. Bank heights in lower reaches up to about 1.5 m (5 ft) on Moose and French Creeks, 1.3 m (4 ft) on Ninetyeight Creek and 1 m (3 ft) on other streams. Heights generally less than 0.6 m (2 ft) in upper reaches.	Sand gravel with some silt, particularly in lower reaches. Silt heavier in lower reaches of Moose and French Creeks.
Standing Bodies of Water							
Lakes and Ponds (See table below)							
Wet Areas							
Muskeg/Bogs	Heavily concentrated on south side of Tanana River floodplain in northwest half of Fort Wainwright. Several small areas in northwest corner of the Yukon Command Training Site on Chena River and Moose Creek floodplains. Some marshy areas along Tanana River floodplain streams.	Unfrozen from about May through October. Generally frozen to bottom remainder of year. May be affected by Tanana and Chena River floods.	Extremely variable, except frozen to bottom in winter.	May reach about 0.3 m (1 ft) or more in summer. Many areas consist entirely of saturated organic matter.	Little or no water movement. Some sluggish discharge through marshy areas.	Wet areas usually merge gradually into higher terrain.	Generally saturated organic matter as much as 1 m (3 ft) thick underlain mostly with silt loam.

LAKES AND PONDS*

MAP NUMBER	NAME	GRID REFERENCE	APPROXIMATE HECTARES (ACRES)
W1	Blair Lake 1	VG820360	222 (550)
W2	Blair Lake 2	VG833380	106 (265)
W3	Lake	VG787385	54 (134)
W4	Lake	VG885375	12 (30)
W5	Lake	VG608560	4 (10)
W6	Lake	VG895597	1 (2.5)
W7	Water filled gravel pit	VG711846	5 (12)
W8	Water filled gravel pit	VG685869	1 (2.5)
W9	Water filled gravel pit	VG685873	16 (40)
W10	Water filled gravel pit	VG686873	3 (7.4)
W11	Water filled gravel pit	VG685897	1.5 (3.7)
W12	Water filled gravel pit	VG725877	2 (4.9)
W13	Water filled gravel pit	VG722878	1 (2.5)
W14	Water filled gravel pit	VG720878	1.25 (3.1)
W15	Water filled gravel pit	VG715884	6 (14.8)
W16	Water filled gravel pit	VG705885	4 (10)
W17	Water filled gravel pit	VG692889	6 (14.8)
W18	Small lake	VG717928	2 (4.9)
W19	Lake	VG995860	8.5 (21)
W20	Water filled gravel pit	VG723911	0.5 (1.3)
W21	Manchu Lake	VG987754	25 (61.7)
W22	Lake	VG980820	25 (61.7)
W23	Lake	VG978824	4 (9.9)
W24	Lake	VG967867	8 (19.8)

*Only selected bodies of water are shown, the smaller bodies are too numerous to depict at mapping scale; there are several hundred small lakes in the study area.

GAUGING STATIONS

MAP NUMBER	LOCATION	DRAINAGE AREA ABOVE GAGE KM^2 (MI^2)	RECORDING PERIOD	MAXIMUM MEAN MONTHLY DISCHARGE M^3/SEC (FT^3/SEC)
*	Tanana River at Nenana	71,229 (27,500)	OCT 1962 - SEP 1970	2781 (98,210)
G1	Chena River at Fairbanks	5128 (1980)	OCT 1948 - SEP 1970	372 (13,120)
G2	Wood River at Fairbanks	2214 (855)	SEP 1968 - SEP 1975	57 (2015)
G3	Tanana River at Fairbanks**	53,458 (20,640)	OCT 1973 - SEP 1977	1626 (57,400)

* **Gauging** station located off map to the southwest, approximately 73 km (46 mi) from Fairbanks.

** Part of river flows through Salchoket Slaugh and is ungaged. Readings at miscellaneous sites indicate that Salchaket Slough carries about 8% of Tanana River flow during high water months.

MEAN MONTHLY DISCHARGE
M3/SEC (FT3/SEC)

MONTH	TANANA RIVER AT FAIRBANKS JUN 1973 - SEP 1977	CHENA RIVER AT FAIRBANKS OCT 1948 - SEP 1976	WOOD RIVER NEAR FAIRBANKS OCT 1968 - SEP 1976
OCT	342 (12078)	34 (1201)	7.8 (274)
NOV	208 (7351)	16 (566)	4.3 (150)
DEC	161 (5698)	12 (426)	3.1 (110)
JAN	145 (5113)	9.5 (335)	2.9 (102)
FEB	142 (5008)	7.8 (277)	2.7 (96)
MAR	133 (4690)	7.2 (255)	2.7 (94)
APR	171 (6031)	10.5 (371)	3.3 (118)
MAY	621 (21930)	122 (4290)	16 (573)
JUN	996 (35176)	74 (2618)	32 (1113)
JUL	1330 (46974)	55 (1928)	35 (1240)
AUG	1313 (46356)	77 (2716)	35 (1246)
SEP	716 (25278)	62 (2190)	16 (556)

FORT WAINWRIGHT, ALASKA

(INCLUDING THE YUKON COMMAND TRAINING SITE AND THE FAIRBANKS PERMAFROST STATION)

TERRAIN ANALYSIS

SURFACE CONFIGURATION

1. LOW PLAINS Flat plains predominate. Slopes are largely less than 3% and local relief is generally between 5 and 35 meters.

2. HIGH PLAINS Smooth to moderately dissected, gentle to rolling and hillocky surfaces. Slopes are largely between 10 and 30% on Fort Wainwright and 3 to 15% on the Yukon Command Training Site. Local relief is between 50 and 150 meters.

3. LOW HILLS Rounded low hills with smooth to moderately dissected surfaces. Slopes are largely between 10 and 30% and local relief is between 150 and 300 meters.

4. HIGH HILLS Moderately dissected, rounded to flat-topped hills of the Yukon Command Training Site. Slopes are largely between 30 and 45% and local relief is generally between 300 and 400 meters.

SURFACE DRAINAGE

Watercourse width*

- >25m
- 15-25m
- 10-15m
- 3-10m
- <3m

0.5 (1.5) / 15° Bank Height /slope, in m(ft) /degrees

1.1 (3.5)	1.1 (3.5)	2.3 (7.5)	3 (10)	Depth low	normal	bankfull	high	estimated in m(ft)
3 (10)	6.1 (20)	6.1 (20)	9.1 (30)	Width low	normal	bankfull	high	

W1 Lake or reservoir

G1 Stream gage

Muskeg

Flood protection structure (levee)

Numbers refer to entries in tables.

*Bank to bank gap width or water width where surface water becomes channelized and has a width greater than 1.5m (5 ft.)

Prepared by the Defense Mapping Agency Hydrographic/Topographic Center, Washington, D.C. for the Terrain Analysis Center, U.S. Army Engineer Topographic Laboratories, Fort Belvoir, Virginia. September 1978.

C. WATER RESOURCES

1. SURFACE WATER

Surface water is plentiful on Fort Wainwright and the Yukon Command Training Site from early June to early December. In winter, most of the streams freeze to the bottom permitting only localized withdrawal of water. The Tanana River, Wood River, Chena River, and the Salchaket Slough on Fort Wainwright are the only streams that flow throughout the year. Maximum flow is usually in July and August because of heavy rainfall, and glacial and snow melt of the Alaska Range. Low flow usually occurs from early November through April as small streams freeze and stream recharge is stored as ice and snow. There are no streams on the Fairbanks Permafrost Station.

From the State of Alaska water resources data, the chemical quality of most surface tested in the Tanana Basin is acceptable. Water bodies which fall below acceptable quality include standing water in ponds which have limited recharge. Dissolved solids in streams range from 60 to 484 milligrams per liter with most averaging less than 200 milligrams per liter. Day to day concentrations of dissolved solids are lowest on Fort Wainwright and highest in streams on the Yukon Command Training Site. Sediment loads in streams on Fort Wainwright are highest in summer months because of heavy runoff from rains, and glacial and snow melt of the Alaska Range. However, non-glacial fed streams on the Yukon Command Training Site have very low sediment yield throughout the year. Water temperatures in streams generally do not exceed 19° (66°F).

MAP UNIT	SOURCES	QUANTITY	QUALITY	DEVELOPMENT OF SOURCES
1. Enormous	The Tanana River, Chena River, Wood River, and the Salchaket Slough provide sources of perennial fresh water for the Fort Wainwright Military Complex. The Tanana River flows northwestward through the Tanana lowlands. The Chena River drains the Yukon-Tanana Upland and flows westward to join the Tanana River. The Wood River flows generally northwestward from the Alaska Range to its confluence with the Tanana River. The Salchaket Slough is a side channel of the Tanana River, and parallels the main stream for 46.0 km (28.6 mi), and rejoins it southwest of Fairbanks. All areas on Fort Wainwright are within 27.0 km (16.8 mi) of a perennial fresh water supply. The closest sources of perennial fresh water for the Yukon Command Training Site are the Chena and Tanana Rivers.	These streams provide enormous* quantities of perennial fresh water with more than 40,000 liters/min (15,000,000 gpd). On the Tanana River high water usually occurs in July and August and low water is usually during March. The minimum flow for the period of record is 5.3 million liters/min (2.0 billion gpd). High water on the Chena River occurs in May and low water occurs in March. The lowest flow recorded is 204,000 liters/min (77.6 million gpd). On the Wood River high water occurs in February. The minimum flow recorded is 84,900 liter/min (32.3 million gpd).	Natural surface waters are of good quality in these streams. The Tanana River is slightly degraded by sewage effluent from Fairbanks. During the summer months on the Tanana River, the dissolved solids content is approximately 120 mg/liter. In winter when water is lowest, the concentrations are highest with 200 of 300 mg/liter. The pH of the river is slightly alkaline with a value of 7.9. In August the sediment load on the Tanana River at Fairbanks ranges from 2000 to 3800 mg/liter and in winter the value is near 500 mg/liter. Sources of these sediments originate in tributaries fed from glacial melt of the Alaska Range. The dissolved solids content in the Chena River ranges from 80 to 100 mg/liter in summer to 150 mg/liter in winter. The pH has an average value of 7.2 and the sediment loading is low because it is a non-glacial fed stream. The annual sediment yield for the Chena River near Fairbanks is approximately 112 tons per square mile per year. In the Wood River the dissolved solids content ranges from 130 to 180 mg/liter throughout the year. The average pH value is 7.8 and the sediment loading is expected to be similar to the Tanana River because the Wood River is also fed from glacial melt of the Alaska Range. Streams from the Alaska Range have a somewhat higher sulfate and magnesium content than streams draining from Yukon-Tanana Uplands, but none of the streams carries excessive amounts of either constituent. The iron content of some of the streams in the study area may be high, particularly if the water is drained from the marshy areas.	In the summer, approaches and access to the Tanana River, Wood River, and Salchaket Slough are difficult to impossible along the boundary of Fort Wainwright because of muskegs/bogs in the old meander scars, backwater areas and sloughs. Winter provides easier access because the ground is frozen. Stream banks of the Tanana River are generally 60% to vertical. Downstream, west of the Tanana River are generally 60% to vertical. Downstream, west of the cantonment area, bank heights range from 2 to 3 m (6 to 9.5 ft) and upstream, to the east, from 1 to 1.6 m (3 to 5 ft). The bank materials along the Tanana River are generally alluvial gravels, sands, and silts which are very unstable. Approaches and access to the Chena River on the Fort Wainwright cantonment area are relatively easy. Where the Chena River enters the cantonment area, banks range in heights from 3 to 4 m (9 to 12 ft) and 4 to 6 m (12 to 19 ft) where the river exits. The bank slopes of the Chena River are very steep and range from 45% to nearly vertical; bank materials consist mostly of silts with some mixed sands and gravels. Stream banks along the Wood River are generally 0.3 to 1.3 m (1 to 4 ft) in height; bank slopes are generally steepest (60% to vertical) in the meander portion of the river because of silts; while the banks are more gradual, 30 to 45%, along the upper braided portion of the stream.
2. Very large**	Clear Creek, Willow Creek, and Crooked Creek are sources of seasonal fresh water for Fort Wainwright from early June to early December. Clear Creek flows northwestward into the Salchaket Slough and passes east of Clear Creek Butte. Willow Creek and Crooked Creek flow northwestward into the Tanana River. Most areas of Fort Wainwright are within 6.6 km (4.1 mi) from one of these streams. Sources of seasonal fresh water for the Yukon Command Training Site are available from Moose Creek, French Creek and the South Fork Chena Creek from early June to early December. Moose Creek meanders westward from the Tanana Upland to the Tanana River. French Creek flows from the Yukon-Tanana Upland into the Tanana River at Elelson AFB. South Fork Chena Creek flows northeastward on the Yukon-Tanana Upland into the Chena River. Most areas on the Yukon Command Training Site are within 3.6 km (2.2 mi) of one of these streams.	These streams provide very large* quantities of fresh water from early June to early December with 4000 to 40,000 liters/min (1,500,000 to 15,000,000 gpd). During the winter months from early November through April, low water occurs because of ice formation and storage of precipitation as snow. Most of the small streams freeze to the bottom during winter.	Streams on Fort Wainwright are of acceptable quality. Dissolved solids content range 130 to 180 mg/liter during the year, primarily because of glacial and snow melt from the Alaska Range. Streams in the Yukon Command Training Site are non-glacial melt streams, and even though the dissolved solids are about the same as on Fort Wainwright (80 to 100 mg/liter in early summer and 150 mg/liter in late summer), the composition of the mineral content is different. High iron and magnesium concentrations are primarily due to the groundwater recharge to stream flow during the winter period.	Approaches and access to stream on Fort Wainwright are almost impossible in summer months due to muskegs/bogs, and dense vegetation. The width of the areas of vegetation along the streams normally varies from 3 to as much as 30 m (9 to 100 ft). The water is not available in winter months due to streams freezing to the bottom. Stream banks are very unstable, composed primarily of silt deposited over sands and gravels. Slopes usually range from 45% to vertical. Bank heights vary from 0.3 m (1 ft) at headwaters of stream to 1 to 1.3 m (3 to 4 ft) in the lower reaches. On the Yukon Command Training Site, only the lower reaches of streams that empty into the Tanana River (French Creek and Moose Creek) exhibit similar characteristics to streams on Fort Wainwright. Approaches to the other streams in the Yukon Command Training Site are poor to fair with wet soil conditions and dense vegetation making access difficult. Most banks are 0.5 to 1 m (1.5 to 3 ft). Banks on Moose Creek and French Creek in their lower reaches have heights up to 2 m (6 ft). In winter most streams are frozen. Bank slopes vary considerably throughout the site. In the lower reaches of all streams, slope varies from 10% to vertical with most being between 10 and 45%.
3. Large**	Sources of seasonal fresh water for Fort Wainright are available from Dry Creek, which is a partially braided stream flowing northwestward between the hills of Blair Lake into Clear Creek. On the Yukon Command Training Site, sources of seasonal fresh water are available from Beaver Creek, Stuart Creek, and Globe Creek, which flow from the Yukon-Tanana Upland into the Tanana River via the Chena River. In the southeastern portion of the training site, Ninetyeight Creek and its tributaries flow from the Yukon-Tanana Upland into the Tanana River via the Salcha River. Little Salcha River drains the western half of the training site and flows into the Tanana River.	These streams provide large* quantities of fresh water from early June to early December with 400 to 4000 liters/min (150,000 to 1,500,000 gpd). During the winter months from early November through April, low water occurs because of ice formation and storage of precipitation as snow. Most of the small streams freeze to the bottom during winter.	Streams on Fort Wainwright are of acceptable quality. Dissolved solids content ranges from 130 to 180 mg/liter during the year, primarily because of glacial and snow melt from the Alaska Range. Streams in the Yukon Command Training Site are non-glacial melt streams, and even though the dissolved solids are about the same as on Fort Wainwright (80 to 100 mg/liter in early summer and 150 mg/liter in late summer), the mineral content is different. High iron and magnesium concentrations are primarily due to the groundwater recharge to stream flow during the winter period.	Approaches and access to streams on Fort Wainwright are almost impossible in summer months due to muskegs/bogs, and dense vegetation. The width of the areas of vegetation along the streams normally varies from 3 to as much as 30 m (9 to 100 ft). The water is not available in winter months due to streams freezing to the bottom. Stream banks are very unstable, composed primarily of silts deposited over sands and gravels. Slopes usually range from 45% to vertical. Bank heights vary from 0.3 m (1 ft) at headwaters of streams to 1 to 1.3 m (3 to 4 ft) in the lower reaches. Approaches and access to streams are poor to fair on the Yukon Command Training Site. Most banks are 0.5 to 1 m (1.5 to 3 ft). In winter most streams are frozen to the bottom. Bank slopes vary considerably throughout the site. In the lower reaches of all streams, slope varies from 10% to vertical with most being between 10 and 45%.
4. Moderate**	Horner Creek and Hunts Creek flow north out of the Yukon-Tanana Upland into the Chena River. Other sources are also available from the headwaters of all streams and tributaries.	These streams provide moderate* quantities of fresh water from early June to early December with 40 to 400 liters/min (15,000 to 150,000 gpd). During the winter months from early November through April, low water occurs because of ice formation and storage of precipitation as snow. Most of the small streams freeze to the bottom during the winter.	Streams on Fort Wainwright are of acceptable quality. Dissolved solids content ranges from 130 to 180 mg/liter during the year, primarily because of glacial and snow melt from the Alaska Range. Streams in the Yukon Command Training Site are non-glacial melt streams, and even though the dissolved solids are about the same as on Fort Wainwright (80 to 100 mg/liter in early summer and 150 mg/liter in late summer), the mineral content is different. High iron and magnesium concentrations are primarily due to the groundwater recharge to stream flow during the winter period.	Approaches and access to streams on Fort Wainwright are almost impossible in summer months due to muskegs/bogs, and dense vegetation. The width of the areas of vegetation along the streams normally varies from 3 to as much as 30 m (9 to 100 ft). The water is not available in winter months due to streams freezing to the bottom. Stream banks are very unstable, composed primarily of silts deposited over sands and gravels. Slopes usually range from 45% to vertical. Bank heights vary from 0.3 m (1 ft) at headwaters of streams to 1 to 1.3 m (3 to 4 ft) in the lower reaches. Approaches and access to streams are poor to fair on the Yukon Command Training Site. Most banks are 0.5 to 1 m (1.5 to 3 ft). In winter most streams are frozen to the bottom. Bank slopes vary considerably throughout the site. In the lower reaches of all streams, slope varies from 10% to vertical with most being between 10 and 45%.

LAKES AND PONDS

Within the confinement of Fort Wainwright, there are hundreds of unnamed lakes. In the south-central portion of the Tanana Lowland, an area known as Blair Lakes is comprised of several lakes. The largest is approximately 22 ha (550 acres) and the smallest is approximately 54 ha (134 acres). The depths are estimated to be up to 7 m (22 ft). In the northeastern corner of the Yukon Command Training Site, there are about 100 unnamed lakes. The largest is 18 ha (45 acres) located at grid coordinates WG985753 and has an estimated depth of 5 m (16 ft). There are no lakes on the Fairbanks Permafrost Station.

The smaller lakes and ponds can be dry 1 to 2 months during the year, while the larger lakes are seldom dry. Water availability is limited by shallow lakes and the freezing of streams.

The iron content in the lakes ranges above and below that in the streams. The degree of hardness of lake water is generally less than streams.

Approaches to all lakes on Fort Wainwright and the Yukon Command Training Site are difficult to impossible with the exception of the Blair Lakes area.

*Definition of terms underlined are as follows:

Quantity Terms	Liters Per Minute (liters/min)	Gallons Per Day (gpd)
Enormous	40,000	15,000,000
Very large	4000 – 40,000	1,500,000 – 15,000,000
Large	400 – 4000	150,000 – 1,500,000
Moderate	40 – 400	15,000 – 150,000

**These streams have estimated quantities of water which were based on similar streams and watersheds in the area.

C. WATER RESOURCES (Continued)

1. SURFACE WATER (Continued)

ANALYSIS OF SURFACE WATER AT FORT WAINWRIGHT

TANANA RIVER AT FAIRBANKS

Gauging Station	Date	Temperature (°C)	Temperature (°F)	Specific Conductance (micromhos)	PH (units)	Bicarbonate (HCO_3) (mg/liter)	Dissolved Nitrate (N) (mg/liter)	Hardness (Ca, Mg) (mg/liter)	Non Carbonate Hardness (mg/liter)	Dissolved Calcium (Ca) (mg/liter)	Dissolved Magnesium (Mg) (mg/liter)	Dissolved Sodium (Na) (mg/liter)	Dissolved Chloride (Cl) (mg/liter)	Dissolved Sulfate (SO_4) (mg/liter)	Dissolved Flouride (F) (mg/liter)	Dissolved Silica (SiO_2) (mg/liter)	Dissolved Solids (mg/liter)	Carbonate (CO_3) (mg/liter)	Dissolved Nitrate (NO_3) (mg/liter)	Total Nitrate (NO_3) (mg/liter)	Total Iron (Fe) (mg/liter)
1	16 Jul 75	16.0	61	194	7.9	92	— —	90	15	27	5.5	3.6	2.5	27	0.1	5.4	125	0	— —	— —	94,000

CHENA RIVER AT FAIRBANKS

HIGH WATER

Gauging Station *	Date	Temperature (°C)	Temperature (°F)	Specific Conductance (micromhos)	PH (units)	Bicarbonate (HCO_3) (mg/liter) **	Dissolved Nitrate (N) (mg/liter)	Hardness (Ca, Mg) (mg/liter)	Non Carbonate Hardness (mg/liter)	Dissolved Calcium (Ca) (mg/liter)	Dissolved Magnesium (Mg) (mg/liter)	Dissolved Sodium (Na) (mg/liter)	Dissolved Chloride (Cl) (mg/liter)	Dissolved Sulfate (SO_4) (mg/liter)	Dissolved Flouride (F) (mg/liter)	Dissolved Silica (SiO_2) (mg/liter)	Dissolved Solids (mg/liter)	Carbonate +CO_3) (mg/liter)	Dissolved Nitrate (NO_3) (mg/liter)	Total Nitrate (NO_3) (mg/liter)	Total Iron (Fe) *** (mg/liter)
2	21 May 50	—	—	107	7.8	50	0.29	51	10	15	3.2	— —	0.5	11	— —	6.9	81	0	1.3	1.3	120
	13–20 May 53	—	—	150	6.6	66	0.34	69	15	20	4.7	2.2	0.8	18	— —	7.8	103	0	1.5	1.5	70
	14 May 54	5.0	41	136	7.3	62	0.34	— —	— —	— —	— —	1.9	0.5	17	— —	8.8	— —	0	1.5	1.5	— —
	27 May 55	—	—	84	6.7	37	0.34	39	9	12	2.1	1.0	0.4	10	0.0	5.4	66	0	1.5	1.5	110
	7 May 58	4.5	40	151	7.0	66	0.11	73	19	22	4.4	1.6	0.5	19	0.2	6.0	103	0	0.5	0.5	180
	10–30 Jun 64	—	—	121	7.4	51	0.34	61	19	16	5.1	2.3	2.1	17	0.2	8.0	74	0	1.5	1.5	60
	7 May 68	2.0	36	88	6.8	38	0.16	45	14	13	3.0	0.9	0.6	12	0.2	4.6	59	0	0.7	0.7	710
	16 May 69	6.0	43	110	7.4	48	0.11	54	15	16	3.5	1.3	0.7	14	0.4	7.3	74	0	0.5	— —	520
	6 May 70	2.0	36	174	7.8	80	0.05	82	16	24	5.3	2.3	0.7	21	0.1	7.3	103	0	0.2	— —	330
	6 May 71	1.5	35	107	6.7	48	0.11	52	13	14	3.9	1.5	2.8	13	0.3	5.0	66	0	0.5	— —	— —
	Average	3.5	38	123	7.2	55	0.22	58	14	17	3.9	1.7	1.0	15	0.2	6.7	81	0	1.0	1.2	263

LOW WATER

Gauging Station	Date	Temperature (°C)	Temperature (°F)	Specific Conductance (micromhos)	PH (units)	Bicarbonate (HCO_3) (mh/liter)	Dissolved Nitrate (N) (mg/liter)	Hardness (Ca, Mg) (mg/liter)	Non Carbonate Hardness (mg/liter)	Dissolved Calcium (Ca) (mg/liter)	Dissolved Magnesium (Mg) (mg/liter)	Dissolved Sodium (Na) (mg/liter)	Dissolved Chloride (Cl) (mg/liter)	Dissolved Sulfate (SO_4) (mg/liter)	Dissolved Flouride (F) (mg/liter)	Dissolved Silica (SiO_2) (mg/liter)	Dissolved Solids (mg/liter)	Carbonate +CO_3) (mg/liter)	Dissolved Nitrate (NO_3) (mg/liter)	Total Nitrate (NO_3) (mg/liter)	Total Iron (Fe) (mg/liter)
2	6 Mar 51	—	—	232	7.5	127	0.38	121	17	33	9.3	9.3	— —	17	— —	17	147	—	1.7	1.7	60
	27 Jan 54	—	—	233	8.2	132	0.41	112	4	32	7.9	4.6	2.2	16	— —	20	154	0	1.8	1.8	0
	2 Jan 58	0.0	32	239	7.9	131	0.41	116	9	31	9.5	4.8	3.5	13	0.0	18	147	0	1.8	1.8	290
	13 Feb 58	0.0	32	241	6.8	134	0.32	118	8	34	7.9	4.0	1.0	14	0.2	21	154	0	1.4	1.4	0
	13 Feb 69	0.0	32	248	7.1	143	0.45	118	1	34	8.0	4.2	0.0	13	0.2	20	154	0	2.0	— —	2100
	3 Mar 70	0.0	32	252	6.6	140	0.52	119	4	36	7.6	4.9	2.1	13	0.2	23	162	0	2.3	— —	3200
	23 Mar 71	0.5	33	220	7.0	115	0.18	110	16	32	7.2	4.2	3.2	17	0.1	16	140	0	0.8	— —	420
	Average	0.1	32	238	7.3	132	0.38	116	8	33	8.2	4.5	2.0	15	0.14	19	151	0	1.7	1.7	867

WOOD RIVER NEAR FAIRBANKS

Gauging Station	Date	Temperature (°C)	Temperature (°F)	Specific Conductance (micromhos)	PH (units)	Bicarbonate (HCO_3) (mh/liter)	Dissolved Nitrate (N) (mg/liter)	Hardness (Ca, Mg) (mg/liter)	Non Carbonate Hardness (mg/liter)	Dissolved Calcium (Ca) (mg/liter)	Dissolved Magnesium (Mg) (mg/liter)	Dissolved Sodium (Na) (mg/liter)	Dissolved Chloride (Cl) (mg/liter)	Dissolved Sulfate (SO_4) (mg/liter)	Dissolved Flouride (F) (mg/liter)	Dissolved Silica (SiO_2) (mg/liter)	Dissolved Solids (mg/liter)	Carbonate +CO_3) (mg/liter)	Dissolved Nitrate (NO_3) (mg/liter)	Total Nitrate (NO_3) (mg/liter)	Total Iron (Fe) (mg/liter)
3	12 Jul 69	8.0	46	299	8.0	100	0.05	136	54	41	8.0	1.4	0.0	56	0.6	5.8	162	0	0.20	— —	50
	29 Jul 70	12.0	54	268	8.0	106	0.20	132	37	38	9.1	1.5	4.5	35	0.2	3.1	147	0	0.90	— —	160
	15 Jul 72	14.5	58	265	7.5	108	0.03	140	55	44	8.3	2.0	0.9	52	0.1	5.9	169	0	— —	— —	170
	Average	11.5	53	277	7.8	105	0.09	136	49	41	8.5	1.6	1.8	48	0.3	1.9	159	0	0.55	— —	127

* The US Geological Survey river gauging and water quality sampling stations used are located outside the military reservation boundary and depicted on the accompanying map.

** Milligrams per liter is mg/liter.

*** Micrograms per liter is mg/liter.

USER NOTE: For permissible concentration of impurities in military water supplies, see Department of the Army Technical Manual TM 5-700, Field Water Supply, July 1967, paragraph 19, or other applicable manuals or regulations.

C. WATER RESOURCES

2. GROUND WATER

Very large quantities of ground water are available on Fort Wainwright and the Yukon Command Training Site; generally, the water is hard and has a high iron content. Ground water conditions are primarily controlled by topography, water-bearing characteristics of the source, and distribution of permafrost. Based on these factors, there are four distinct source areas: the Tanana-Chena Rivers floodplain; alluvial fan and glacial outwash deposits; creek valley bottoms; and upland hills.

The Tanana-Chena floodplain, relatively flat, containing fine-to-course-grained material, and a moderate distribution of permafrost, offers the best source of ground water on the reservation. The floodplain deposits consist of alternating layers and lenses of alluvial silt, sand, and gravel. The alluvium is generally very permeable; consequently the occurrence of ground water is primarily controlled by the distribution of permafrost.

Permafrost in floodplain deposits is discontinuous, randomly distributed, and generally absent under younger slough and meander scars as well as under and near present rivers. Depth to permafrost ranges from 1 meter (3.3 feet) under uncleared areas to 8 to 13 meters (26.2 to 42.7 feet) under cleared land. Maximum known thickness of the permafrost is 84 meters (275.6 feet). The water table in unfrozen areas is 3 to 5 meters (9.8 to 16.4 feet) below the surface; in perennially frozen areas, ground water occurs above, below and as lenses within the permafrost layer. The sporadic occurrence of permafrost accounts for the differences in character of adjacent wells.

Alluvial fan and glacial outwash deposits, gently rolling and uniformly northward sloping, stratified layers and lenses of stream-sorted sand and gravel, offer the second best source, by volume, of ground water. Water quality is better than that of the floodplain makes these deposits generally inaccessible and so diminishes their importance as a water source. Permafrost is less common in this unit, but can cause problems where it occurs near the Tanana-Chena floodplain.

Creek valley bottoms contain abundant ground water of poor quality. Permafrost is prevalent in this unit, and may extend from near the surface to bedrock. High organic content in the boggy silts of the valley bottoms makes the ground water undesirable. Below these silts, unfrozen gravels just above bedrock, and the bedrock itself, are two of the best sources of ground water in the unit. A third good source is artesian springs which occur along the edges of the valley floor where percolating groundwater is dammed by permafrost in the lower slopes.

The Yukon-Tanana uplands are a source of good quality ground water which is softer and contains less iron than the water of the Tanana-Chena floodplain. The rolling upland hills are covered by 1 to 60 meters (3 to 196.9 feet) of windblown silts. The relief and good vertical permeability of the unfrozen silts result in well drained soils which lack significant ground water. The underlying bedrock offers a reasonable source of good quality ground water where sufficient fractures and joints occur. The locations of fracture zones are rantdom and difficult to predict; in general the water table is deep. Wells in this unit have a low yield and slow recharge, rendering this a poor water source when heavy use is expected. In some areas, there are perched water tables along fracture zones or above permafrost on northern slopes and at the base of hillslopes. In most of the uplands, the water table is less than 30 to 60 meters (98.4 to 196.9 feet) above the adjacent valley floor.

MAP UNIT	QUANTITY AND SOURCE	DEPTH	QUALITY	DEVELOPMENT OF SOURCES
1.	Very large quantities of ground water with yields of 126.2 liters per second to 189.2 liters per second (2000 to 3000 gpm) from alluvial sands and gravels of Tanana-Chena floodplain. Lenses of water-bearing river sands and gravels occur locally under alluvial silt fans. Water table 3 to 5 m (9.8 to 16.4 ft) below surface, recharge rates excellent. Where permafrost is present, water may be above, below, or within permafrost horizon.	Depth of alluvial fill ranges from 3 m (9.8 ft) near uplands, to over 200 m (656.2 ft) about 3.2 km (2 mi) south of Fairbanks. Water table generally 3 to 8 m (9.8 to 26.2 ft) below surface; permafrost may cause local variations in depth.	Generally poor in quality due to high iron content and high degree of hardness (as much as 300 ppm). High potential for contamination of water above permafrost zone.	Excellent aquifer; wells may be drilled almost anywhere; occasional permafrost may cause differences in yield and ground water depth from one well to another. Drilling easy in unconsolidated material. Wells generally less than 30 m (98.4 ft) deep. Water must be treated to remove iron.
2.	Large quantities of fresh water from alluvial fan and glacial outwash deposits which extend north from the Alaska Range to Tanana-Chena floodplain. Aquifers in alluvial fans are sloping beds of sands, gravels, and cobbles; in glacial outwash, lenses or poorly to well sorted silt, sand, gravel, and cobbles deposited by streams from glaciers.	Deepest in the south, thinning northward as deposits merge with floodplain alluvium, average depth 100 m (328.1 ft) with water table 10 to 30 m (32.8 to 98.4 ft) below surface. Permafrost may effect water table near Tanana-Chena floodplain.	Good quality water, contains fewer organics and less iron than does water from floodplain. Water probably hard.	Good aquifer; greatest flow expected in wells near streams. Difficult access; lack of permanent roads restricts development of wells.
3.	Moderate to large quantities of fresh water from creek valley bottoms. Unfrozen gravel 9 to 94 m (29.5 to 308.4 ft) below the surface yields 4.7 to 12.6 liters per second (75 to 200 gpm). Artesian wells with moderate continuous yields along slopes adjacent to valley floors. Organic silt overlies aquifer of stream sorted gravel in major upland stream valleys. May be perennially frozen; ground water available where permafrost does not extend to bedrock.	10 to 100 m (32.8 to 328.1 ft) in depth; may be underlain by 30 m (98.4 ft) of coarse gravel deposits. Most silts perennially frozen; water table beneath permafrost. Some ground water above permafrost boundary.	Water from silts and gravels has high organic content; very poor quality. Better quality water from bedrock beneath valley fill, quality may be lower than water contains organics from overlying material.	Coarse gravel deposits 30 m (98.4 ft) thick under 10 to 100 m (32.8 to 328.1 ft) of permanently frozen silt can provide abundent quantities of water if permafrost does not extend from silt through gravel and into bedrock. Artesian formations may be located along valley walls where permafrost traps percolating ground water. Permafrost may cause problems in drilling. Valley bottom muck makes access difficult.
4.	Small quantities from bedrock in upland hills. Low yields 0.1 to 0.6 liters per second (2 to 10 gpm), slow recharge, and large drawdown. Bedrock hills covered by 1 to 60 m (3.3 to 196.7 ft) of windblown silt have deep water table; water generally restricted to fractures and joints in crystalline rocks.	Windblown silts blanket upland to a depth of 60 m (196.9); highly permeable; water table generally deep. Ground water occurs below silts in jounted and fractured bedrock. Water table may be 30 to 60 m (98.4 to 176.9 ft) above adjacent valley bottoms; influenced by permafrost on lower slopes.	Good to very good quality water, (100 to 400 ppm). with low iron content.	Fractures and joints randomly spaced and difficult to find. Rock is hard; drilling will be difficult.

WATER QUALITY, FORT WAINWRIGHT, ALASKA

CHEMICAL ANALYSIS OF GROUND WATER WELLS

CONSTITUENT	UNIT OF MEASURE*	WELL NUMBER AND DATE OF SAMPLE** 2(1011) Jul 74	3(1032) Jul 74	5(3698) Feb 75	6(4023) Jun 76	7(4073) Jun 76	8(4074) Jun 76
Alkalinity (as CAC03)	mg/1	200.00	170.00	124.00	145.00	137.00	140.00
pH		7.50	7.40	7.40	6.00	8.43	6.28
Hardness (total as CAC03)	mg/1	209.00	179.00	135.00	149.00	137.00	150.00
Calcium	mg/1	63.60	53.60	38.00	42.70	39.50	45.40
Potassium	mg/1	3.30	3.50	3.00	3.40	3.40	3.40
Silica	mg/1	21.00	20.20	31.00	29.20	36.20	27.20
Specific conductance	μ mhos	396.00	312.00	291.00	295.00	290.00	2094.00
Total dissolved solid	mg/1	257.00	224.00	191.00	220.00	211.00	2021.00
Langlier index (corrosive)		–.042	–.276	–.551	.16027	.53187	.36834
Color		<5.00	<5.00	25.00	10.00	6.00	7.00
Fluorides	mg/1	.16	.18	1.11	<.10	.18	.12
Iron	mg/1	9.10	9.60	.29	5.85	2.22	2.86
Magnesium	mg/1	12.60	11.30	9.70	10.30	10.10	10.50
Manganese	mg/1	1.12	.95	.51	.589	.30	.478
Chlorides	mg/1	2.20	2.20	1.00	1.30	1.00	1.00
Sulfates	mg/1	15.30	15.30	17.60	16.8	17.20	19.80
Arsenic	mg/1	<.01	<.01	<.01	<.01	<.01	<.01
Barium	mg/1	N/A	N/A	<.30	<.30	<.30	<.30
Boron	mg/1	<.10	<.10	<.10	<.10	<.10	<.10
Cadmium	mg/1	<.001	<.001	<.001	<.001	<.001	<.001
Chromium	mg/1	<.01	<.01	<.01	<.01	<.01	<.01
Copper	mg/1	<.01	<.01	.11	<.02	<.02	<.02
Lead	mg/1	<.01	<.01	.047	<.01	<.01	<.01
Mercury	mg/1	N/A	N/A	<.002	<.004	<.004	<.004
Nitrates (as nitrogen)	mg/1	<.04	<.04	<.040	<.04	<.04	<.04
Silver	mg/1	<.01	<.01	<.01	<.01	<.01	<.01
Sodium	mg/1	5.30	4.80	3.90	4.30	4.9	4.20
Zinc	mg/1	<.01	<.01	.32	.033	<.02	<.0806
Gross Alpha	PC/1	<.70	<.70	<.70	<.60	2.40	<.60
Gross Beta	PC/1	4.50	4.00	2.90	2.70	3.00	2.90
Tritium	micro curie/1	<.10	<.10	.008	.005	.003	.0004

* mg/1 = milligrams per liter; μmhos = micromohs; PC/1 = Pico Curies per liter.

** Numbers in parentheses are Fort Wainwright designations.

N/A = Not analyzed.

Note: Definition of underlined terms is as follows:

	Liter Per Minute	Gallons Per Day (gpd)
Very large	4,000 – 40,000	1,500,000 – 15,000,000
Large	400 – 4,000	150,000 – 1,500,000
Moderate	40 – 400	15,000 – 150,000
Small	4 – 40	1500 – 15,000

USERS NOTE: For permissible concentrations of impurities in military water supplies, see Field Water Supply, TM5-700, July 1967, Paragraph 19, or other applicable manuals or regulations.

CHARACTERISTICS OF WELLS AT FORT WAINWRIGHT

Building Number		1568	1011	1032	3003	3405	4023	3565	3363	1115	41168	1172	1173	2060	2092	5001	3594	1167
Well use Ir – Irrigation I – Individual M – Main S – Standby		S	S	S	S	S	S	M	M	I	I	I	I	Ir	I	I	I	I
Well Depth	meters	34	20	18	49	34	34	63	36	16	15	79	21	24	23	27	34	
	feet	112	65	58	160	110	110 (EST)	208	118	52	50 (EST)	260	68	79	75	90	110	
Well Location (Bldg)		1568	1011	1032	3003	3405	4023	3565	3563	1115	1168	1172	1173	2060	2092	5001	—	—
Amount of Flow												19	38	95	95	38	2839	95
liters per minute		1893	2839	2839	2271	3785	2839	4826	2839	95	95	S	10	25	25	10	750	25
gallons per minute		500	750	750	600	1000	750	1275	750	25	25							

FORT WAINWRIGHT, ALASKA

(INCLUDING THE YUKON COMMAND TRAINING SITE AND THE FAIRBANKS PERMAFROST STATION)

TERRAIN ANALYSIS

WATER RESOURCES

SURFACE WATER

FRESH WATER PERENNIALLY PLENTIFUL

1. Enormous quantities available from the Chena River, Tanana River, Wood River, and the Salchaket Slough.

FRESH WATER SEASONALLY PLENTIFUL

2. Very large quantities available from the lower reaches of larger tributaries and streams such as Clear Creek, Willow Creek, Crooked Creek, Moose Creek, French Creek, and South Fork Chena from early June to early December.

3. Large quantities available from the lower reaches of small streams and tributaries such as Dry Creek, Beaver Creek, Stuart Creek, Globe Creek, Ninteyeight Creek, and the Little Salcha from early June to early December.

4. Moderate quantities of water available from Horner Creek, Hunts Creek, and the headwaters of all streams and tributaries from early June to early December.

▲3 Gaging stations used for water quantity sampling.

*In most years virtually all streams except the Tanana, Chena, Wood River, and Salchaket Slough freeze to the bottom during the winter (late December until late May).

Numbers refer to entries in tables.

GROUND WATER

FRESH WATER GENERALLY PLENTIFUL

1. Very large quantities available from floodplain deposits of the Tanana and Chena River.

FRESH WATER LOCALLY PLENTIFUL

2. Large quantities available from alluvial fan and glacial outwash deposits.

3. Moderate to Large quantities available from gravel deposits in creek valley bottoms.

FRESH WATER SCARCE

4. Small quantities available from joints and fractures in upland bedrock.

●18 Well

*Definitions of underlined terms are as follows:

	Liters Per Minute (lpm)	Gallons Per Day (gpd)
Enormous	>40,000	>15,000,000
Very Large	4,000–40,000	1,500,000–15,000,000
Large	400–4,000	150,000–1,500,000
Moderate	40–400	15,000–150,000
Small	<40	<15,000

USER NOTE: For permissible concentrations of impurities in military water supplies, see Field Water Supply, TM-5-700, July 1967, paragraph 19, or other applicable manuals regulations.

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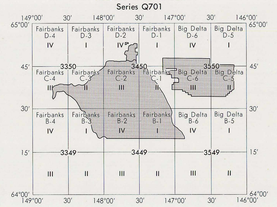

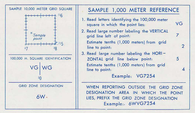

SAMPLE 1,000 METER REFERENCE

1. Read letters identifying the 100,000 meter square in which the point lies. VG
2. Read large number labeling the VERTICAL grid line to point. 7
   Estimate tenths (1,000 meters) from grid line to point. 2
3. Read large number labeling the HORIZONTAL grid line below point. 5
   Estimate tenths (1,000 meters) from grid line to point. 4

Example: VG7254

WHEN REPORTING OUTSIDE THE GRID ZONE DESIGNATION AREA IN WHICH THE POINT LIES, PREFIX THE GRID ZONE DESIGNATION.
Example: 6WVG7254

Scale 1:125,000

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 Meters

1 0 1 2 3 4 5 6 7 Statute Miles

CONTOUR INTERVAL 200 FEET
SUPPLEMENTARY CONTOURS 100 FEET

Prepared by the Defense Mapping Agency Hydrographic/Topographic Center, Washington, D.C. for the Terrain Analysis Center, U.S. Army Engineer Topographic Laboratories, Fort Belvoir, Virginia. September 1978.

D. ENGINEERING SOILS

Engineering soils data in this table and on the map have been derived from published soil surveys in limited areas adjacent to the study area, and by utilizing geologic and topographic maps, aerial photography, and various publications. The cantonment area, comprising less than two percent of the study area, is the only portion of the reservation that has been surveyed. This survey was performed in 1968 by the U.S. Department of Agriculture, Soil Conservation Service. Until all of the reservation has been surveyed, knowledge of the kinds of soil and their distribution remains highly generalized and exceedingly tentative. The data presented here can be useful for broad planning purposes but for specific site information, on-site inspection and testing is required.

Soils in the study area have been grouped into six categories based primarily on their characteristics and suitability for various engineering uses. The profile diagrams shown below depict the soils and the vertical arrangement of horizons believed to be dominant in each category.

The Fort Wainwright Military Reservation is in the Tanana River Valley with the Yukon Command Training Site situated on the uplands east of the valley. The valley is filled with alluvium derived from the Alaska Range to the south. In the Southern part of the study area soils have developed from alluvial fan or glacial outwash material. Terraces along the Tanana River are composed of deep stream-deposited alluvium. Upland areas in the Yukon Command Training Site are mainly rolling hills composed of igneous and metamorphic rocks covered with loessal silt.

Unique in the study area is the extensive mantle of loessal silt or redeposited alluvial silt. This material ranges in thickness from as little as 0.3 meters (1 foot) on upland ridges to as much as 61 meters (200 feet) in some valleys where the silt has been fluvially redeposited. Another unique characteristic is the lack of clay-sized material. The percentage of clay in any of the soils rarely exceeds 15 percent.

An overriding consideration in the engineering use of soils on the Fort Wainwright Reservation is the presence or absence of permafrost (perennially frozen ground). The reservation is in the zone of discontinuous permafrost. In the uplands, permafrost occurs primarily in the narrow valley bottoms and on north-facing slopes. In the Tanana River Valley, it is most likely to occur in fine-grained soils and in areas of peat. On floodplains, soils with a high component of coarse-grained material are generally free of permafrost. Measurements at one location in the western part of the cantonment area indicated the depth of the base of permafrost to be 47 meters (153 feet).

The surfaces of most soils are blanketed with a thin layer of strongly acid, organic material composed of partly decomposed moss, leaves, and twigs, matted together with many fine rootlets. Disturbance or destruction of this mat in permafrost areas can result in thaw in the upper part of the permafrost with consequent subsidence of the overlying soil.

In areas of low relief with permafrost, poor drainage is characteristic. Summer thaw creates a perched water table above permafrost due to the impermeability of the frozen ground; rates of evapotranspiration are very low and the result is saturated or flooded soil. The depth of thaw varies with topographic position and vegetation. Soils on north-facing slopes under spruce forests and soils in muskeg areas may only thaw 0.3 to 0.6 meters (1 to 2 feet), whereas soils in other areas with permafrost may thaw as much as 1 meter (3 feet).

The thawing of permafrost is one of the major problems for engineering use and construction on Fort Wainwright. Some structures may be damaged by slight settling. In a few areas, structures have been abandoned because of severe damage caused by the thawing of the permafrost. Areas of permafrost near the surface present severe construction problems. Water frozen in the active layer can cause swelling of the ground and frost heave. Buildings, roads, and airfield runways may be ruptured and deformed. Special engineering techniques must be employed to overcome this problem.

SOIL CHARACTERISTICS AND SELECTED EVALUATIONS

MAP UNIT	LANDFORM AND SLOPE	TYPICAL SOIL PROFILE – layers, thickness and color of layers, depth to rock and Unified engineering classification. 1/ (Profile diagram not to scale.)	HIGH WATER TABLE 2/ depth (meters) and duration (months)	PERMEABILITY centimeters/hour (inches/hour)	SUSCEPTIBILITY TO FROST ACTION	PERMAFROST	RATING AND MAJOR KINDS OF LIMITATIONS FOR: SEWAGE LAGOONS	SEPTIC TANK FILTER FIELDS	FOUNDATIONS FOR SMALL BUILDINGS	ROAD LOCATION	SHALLOW EXCAVATIONS	TRAFFICABILITY	BIVOUAC SITES	REMARKS
1	Nearly level to gently sloping outwash plains and recent alluvial fan deposits. Slopes generally 0 to 3%; occasionally 3 to 7%.	cm Pt – Organic mat; sphagnum moss and grasses. 5 ML – Grayish-brown to yellowish-brown silt. 60 GW, SW – Gray to yellowish-brown gravel or gravelly sand; well stratified with lenses of clean, well-sorted coarse sand. 150+	2 m (6.6 ft) Jun – Sep	ML – 2.0 to 6.4 (0.8 to 2.5) GW, SW – 12.7 to 25.4 (5.0 to 10.0)	High to moderate	Discontinuous. Small areas at depths of 3 or generally more than 3 m (10 ft). Also, some ground ice.	Moderate to Severe (p, q, s, z)	Severe (p, x, z)	Moderate to Severe (x, z)	Moderate to Severe (t, w, x, z)	Moderate (p, z)	Moderate (d, t, w, x)	Moderate (w)	Soil contains large gravels and cobbles and areas with gravels on or near the surface; good source of gravel and sand. Some scattered small depressions with peat. Low areas may be flooded during season of thaw. Total depth of soil estimated to be many tens of meters. Soil similar to the Volkmar series except better drained. 3/
2	Similar to Map Unit 1.	cm Pt – Organic mat; sphagnum moss and grasses. 5 ML – Grayish-brown to yellowish-brown silt. 100 GW, SW – Gray to yellowish-brown gravel or gravelly sand; well stratified with lenses of clean, well-sorted coarse sand. 150+	2 m (6.6 ft) Jun – Sep	ML – 2.0 to 6.4 (0.8 to 2.5) GW, SW – 12.7 to 25.4 (5.0 to 10.0)	High to moderate	Discontinuous. Small areas at depths of 3 or generally more than 3 m (10 ft). Also, some ground ice.	Moderate to Severe (p, q, s, z)	Severe (p, x, z)	Moderate to Severe (x, z)	Moderate to Severe (t, w, x, z)	Moderate (p, z)	Moderate (d, t, w, x)	Moderate (w)	Soil very similar to Map Unit 1 except loessial silt layer thicker, gravels smaller, and less surficial gravel.
3	Nearly level, well-drained soils on broad alluvial plains and terraces. Most slopes between 0 and 3%.	cm Pt – Organic mat of fine roots and moss. 8 ML or SM – Grayish-brown, friable, silt or fine sandy silt. Commonly contains thin lenses of organic matter. 51 SP – Gray fine sand; loose and structureless. 115 GP, SP – Rounded gravel and coarse gravelly sand. 150+	Greater than 3 m (9.8 ft) Jun – Aug	ML, SM – 2.0 to 6.4 (0.8 to 2.5) SP, GP – 12.7 to 25.4 (5.0 to 10.0)	Moderate	Discontinuous. Where present, depth to permafrost generally more than 3 m (10 ft).	Moderate (p, s, z)	Severe (p, z)	Slight	Slight	Slight	Slight	Slight	Map unit area includes poorly drained soils in old stream channels. Good source of gravel. Gravel occurs at varied depths. Area also includes small patches of old sand dunes covered with up to 1 meter (3 ft) of silt (loess). Soils similar to the Salchaket series.
4	Nearly level to gently sloping, mostly poorly drained soils in upland valleys and broad alluvial flats between major streams and adjacent uplands. Slopes range between 0 and 3%.	cm Pt – Organic mat of roots, moss and lichens. 13 ML – Dark gray mottled silts and loams with streaks of black. 73 ML, GP – Gray silts. In places very gravelly and with cobblestones; commonly stratified. 150+	0.4 m (1.3 ft) Jun – Aug	ML – 2.0 to 6.4 (0.8 to 10.0) GP – 12.7 to 25.4 (5.0 to 10.0)	High	Present is uncleared areas at depths below about 0.50 m (20 in).	Severe (p, w, x, z)	Severe (p, w, x, z)	Severe (p, x, w, z)	Severe (p, w, x, z)	Severe (p, w, x, z)	Severe (t, w)	Severe (w)	Permafrost recedes after clearing burning, or disturbance of surface organic mat. Water table perched above permafrost. Fair to unsuitable as a source of gravel. Soils similar to the Goldstream and Tanana series.
5	Rolling to steep hills of the uplands including the base of hills Slopes range from nearly level to greater than 45%; dominantly 7 to 12%.	cm Pt – Organic mat of roots, moss, or forest litter. 5 ML – Silt. Colors range from dark brown in the upper part to olive in the lower sections. Very friable. 150+	Greater than 3 m (9.8 ft) Jun – Aug	ML – 2.0 to 6.4 (0.8 to 2.5)	High to Moderate	Generally lacking but may occur discontinuously at depths of several meters on north-facing slopes.	Moderate to Severe (h, k, r, s)	Severe (r, x, z)	Moderate (h, t, z)	Moderate (b, h, z)	Moderate (r, z)	Moderate (h, t)	Slight	Soils formed in loess or colluvium derived from loess; loess high in mica. Total thickness of soil highly varied. Generally, it is 150 cm (59 in) or more to bedrock, but on some high ridges, rock occurs at the surface. Soils similar to the Fairbanks, Gilmore, and Minto series.
6	Shallow depressions on alluvial terraces and river floodplains. Slopes 0 to 3%.	cm Pt – Dark brown moss peat in horizontal layers. 33 Pt – Dark brown moss peat with many layers of black sedge peat. 64 ML – Gray and brown very fine sandy silt. 100 GP, SP – Rounded gravel and coarse sand. 150+	At or very near the surface.	4/	High	Present at depths ranging from about 38 to 76 cm (15 to 30 in).	Severe (f, o, w, x)	Severe (f, o, w, x, z)	Severe (f, o, w, x, z)	Severe (f, o, w, x, z)	Severe (f, w, x, z)	Severe (f, w, t, z)	Severe (f, o, w)	Peat layers may be much thicker in some places than indicated in profile diagram. Map unit area contains many small lakes and ponds. Soils similar to the Lemeta series.

1/ The Unified Soil Classification System. Technical Memorandum No. 3-357, U.S. Army Corps of Engineers. March 1953.

2/ Depth to water table before clearing of vegetation. In soils with permafrost and free water perched above frozen ground, the water table may drop when the surface mat of vegetation is removed.

3/ Soils that have profiles almost alike make up a soil series. The soil series listed for each map unit are the ones believed to be dominant. These soils are definitively described in the Salcha-Big Delta Soil Survey (see List of Sources).

4/ Soil is normally frozen; no estimate made.

SOIL CHARACTERISTICS AFFECTING RATINGS

b – erosion
d – dust
f – floods
h – slope
k – susceptibility to piping
o – high in organic matter
p – perched or high water table
q – high permeability
r – stony or shallow soils
s – seepage
t – low strength
w – wetness
x – perennially frozen ground
z – frost action

DEFINITION OF RATING TERMS

SLIGHT – relatively free of limitations or limitations easily overcome.

MODERATE – *limitations can be overcome with good planning* and/or careful design.

SEVERE – limitations are serious and are difficult to overcome.

FORT WAINWRIGHT, ALASKA

(INCLUDING THE YUKON COMMAND TRAINING SITE AND THE FAIRBANKS PERMAFROST STATION)

TERRAIN ANALYSIS

ENGINEERING SOILS

SOILS ON BROAD OUTWASH PLAINS AND ALLUVIAL FAN DEPOSITS

1. Silty soil overlying stratified coarse sand and gravel; silt layer relatively thin.
2. Silty soils overlying stratified sand and gravel; silt layer relatively thick.

SOILS ON BROAD ALLUVIAL PLAINS AND LOW TERRACES

3. Well-drained very fine sand and silts overlying stratified gravel and gravelly sand.
4. Poorly drained silts and loams commonly overlying stratified fine sand, silts, and gravels.

SOILS ON NEARLY LEVEL STEEP UPLANDS

5. Well-drained silty soils, chiefly loess over bedrock, that varies from shallow to deep.

SOILS ON FLOODPLAINS, TERRACES, AND IN SHALLOW DEPRESSIONS THAT ARE NEARLY ALWAYS WET

6. Very poorly drained peat over sand silt, sand, and gravel.

NOTE: Numbers refer to entries in tables.

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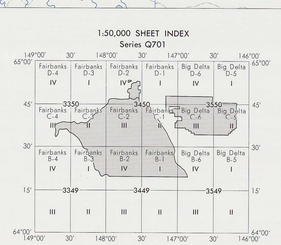


SAMPLE 10,000 METER GRID SQUARE

10,000 m SQUARE IDENTIFICATION: VG WG

GRID ZONE DESIGNATION: 6W

SAMPLE 1,000 METER REFERENCE

1. Read letters identifying the 100,000 meter square in which the point lies: VG
2. Read large number labeling the VERTICAL grid line left of point. Estimate tenths (1,000 meters) from grid line to point: 7
3. Read large number labeling the HORIZONTAL grid line below point. Estimate tenths (1,000 meters) from grid line to point: 5
4. Example: VG7254

WHEN REPORTING OUTSIDE THE GRID ZONE DESIGNATION AREA IN WHICH THE POINT LIES, PREFIX THE GRID ZONE DESIGNATION. Example: 6WVG7254

Scale 1:125,000

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 Meters

0 1 2 3 4 5 Statute Miles

CONTOUR INTERVAL 200 FEET
SUPPLEMENTARY CONTOURS 100 FEET

Prepared by the Defense Mapping Agency Hydrographic/Topographic Center, Washington, D.C. for the Terrain Analysis Center, U.S. Army Engineer Topographic Laboratories, Fort Belvoir, Virginia. September 1978.

E. ENGINEERING GEOLOGY

Fort Wainwright and the Yukon Command Training Site are in the Tanana Kuskokwim Lowlands and Yukon-Tanana Uplands of central Alaska. Fort Wainwright occupies a portion of the Tanana-Chena River floodplain and extends south onto the alluvial fan and glacial outwash deposits which descend from the Alaska Range. The Yukon Command Training is on hills of metamorphic and igneous rock which separate the Chena and Tanana river systems.

Unconsolidated sediments of various origins are the predominant source of engineering materials in the Fort Wainwright area. Their occurrence on all nearly level surfaces as well as on most upland slopes demands consideration of these sediments as the primary foundation for most engineering structures. Floodplain alluvium, consisting of well rounded and sorted silt, sand, and gravel, fills the Tanana-Chena Rivers floodplain to a depth of approximately 200 meters (656 feet); this material is the most important and one of the most extensive deposits in the area. Windblown silt loess derived from glacial "rock flour" has been deposited on hillslopes in and around the study area. Much of the loess has been reworked by running water and frost action and then redeposited in stream valleys as thick layers of silt. The silts may be perennially frozen, making this material poorly suited for construction foundations. The southern part of the Tanana lowlands is covered by thick layers of glacial outwash and alluvial material deposited by streams from the Alaska Range to the south. This alluvium, consisting of sands and gravels, is good construction material, but is not readily accessible. A small field of Quaternary Age sand dunes, now covered with a thin mantle of silt, is near the confluence of the Wood and Tanana Rivers on the western edge of the reservation.

Granite intrusives of Mesozoic Age and metamorphic rocks of Jurassic Age or older are potentially the most useful rocks for engineering purposes. The granites may be deeply weathered, so any potential quarry or foundation sites should be studied in detail. A band of meta-volcanics, also of Pre-Jurassic Age, runs diagonally through the Yukon Command Training Site. Other rock types of limited areal extent include basalts currently being extracted from hillslopes near the cantonment area, ultramafimcks, and gneisses.

The geology of the Yukon Command Training Site has been taken from preliminary sources produced from reconnaissance surveys and is, therefore, less definitive than the geology of Fort Wainwright proper. Most of the rock outcrops are within the Yukon Command Training Site and the rock descriptions below may be less specific than the descriptions of unconsolidated materials. Engineering properties are necessarily generalized for all units and are based largely on field observations in the Fairbanks area. Such generalizations may be useful in preliminary plans and designs, but are not intended to supplant standard field and laboratory tests.

MAP UNIT	TOPOGRAPHY	ROCK DESCRIPTION	PHYSICAL CONSTANTS	PERMAFROST AND FROST ACTION	ENGINEERING EVALUATION	EXCAVATION FACTORS	PITS AND QUARRIES
1 Floodplain Alluvium	Along the Tanana, Chena, and Wood Rivers; widest opposite Fairbanks, where the floodplain is approximately 27 km (14.7 mi) wide. Floodplain characterized by numerous shallow swales and meander and slough scars. A few ponds are present, and several small streams meander across the floodplain surface. Low terrace escarpments mark locations of earlier river stages.	Well stratified layers and lenses of unconsolidated gray silt, sand, pebbles, cobbles, and boulders. Larger materials range from 0.6 cm (0.25 in) to 100 cm (39.4 in) in diameter. Dark brown to black peat and silt more than 1.5 m (5 ft) thick occupy swales. A thin layer of silt may blanket the alluvium. Glacial debris, brought into the Tanana Valley by streams from the Alaska Range, caused river to aggrade its channel. The Tanana River, now at northern edge of floodplain has reworked and redeposited this glacial material.	High bearing strength when frozen. Sand and gravel maintain high strength when thawed. Silt has moderate to high bearing strength when thawed if dry; otherwise, strength low to very low.	Depth to permafrost ranges from .5 to .6 m (1.5 to 2 ft) in swales and basins to 7.6 to 12.2 m (25 to 40 ft) in some cleared areas. Permafrost discontinuous, especially absent beneath lakes, rivers, and creeks. Sand and gravel not susceptible to frost action; in silts, frost action moderate to intense.	Extensive level areas suitable for linear or multi-structure construction. Silt overburden must be removed or insulated with gravel; swales and slough scars should be avoided. Material difficult to compact, with little subsidence when thawed except in swales, where subsidence is moderate. Abundant gravel available for aggregate and road metal if screened to remove fines.	Material easily excavated with lower equipment except where perennially frozen or in swales. Slopes in gravel, frozen sands and dry silts will stand at 1:1 to 0.7:1.	Several small gravel pits present. Numerous potential sites. Floodplain south of the Tanana River. Inaccessible in summer due to mucky conditions, and frozen in winter.
2 Granitic Rock	Outcrops of granitic rock generally limited to upland areas on the western side of the Yukon Command Training Site. Granite forms rounded ridges and hilltops. Steep bluffs occur adjacent to creeks and rivers.	Gray to yellow-brown, medium to coarse, augite-bearing, biotite granite containing some microcline phenocrysts. Weathers spheroidally to a brown color. Depth of weathering from 1 to 5 m (3 to 16 ft). Ranges rock was emplaced during an episode of granitic plutonism which lasted from cretaceous period (130 x 10^6 ybp) * through early tertiary period (25 x 10^6 ybp).	Granite has high bearing strength and low permeability. Granodiorite, which forms Approach Hill (east of the airfield) on Fort Wainwright, has the following properties: Specific Gravity 2.54 Unit Weight (lb/ft^3) Loose 91.0 Dry Rodded 49.5 Adsorption (%) 2.4 L.A. abrasion (% loss) 24.4	No permafrost recorded. Unit not susceptible to frost action.	High bearing strength suitable for heavy structures; steep slopes, however, preclude, multistructure construction. Weathered rock provides good base course, road metal, and concrete aggregate without crushing. Fresh rock good for riprap or pervious fill.	Weathered granites easily excavated with power tools; fresh rock may require blasting.	No known quarries present. Potential sites along dirt access road to the Yukon Command Training Site and on Approach Hill, east of the airfield.
3 Metamorphic Rock	Forms rounded to gently rolling hills with steep slopes flanking valley bottoms. Undifferentiated metamorphic rocks occur on midlevel slopes on the eastern half of the Yukon Command Training Site, on some ridge tops on the eastern half of the training site and on the hills around Blair Lakes, on Clear Creek Butte on the Tanana floodplain, and along the northern edge of the Chena floodplain on Fort Wainwright.	Light- to dark-gray, reddish-brown to tan-weathering schists, predominantly quartz-calcite and quartz-mica. Includes lesser amounts of carbonaceous and calcareous schists as well as amphibolite, impure marble, and a light-brown gneiss which has been affected by retrograde metamorphism. Quartz stringers form seams throughout the rock. Rock is a hornfels where it is in contact with intrusives. The rock may be weathered as deeply as 15.2 m (50 ft). Metamorphic rocks of the Yukon-Tanana complex were originally dated as pre-cambrian age (570 x 10^6 ybp). Recent Potassium/Argon age determinations show that the schists were recrystallized in Jurrasic Period (150 x 10^6 ybp).	Gneissic facies has high bearing strength. Schistose facies has high bearing strength if strata are horizontal or vertical, but only moderate bearing strength if strata are dipping. Engineering properties for two schist samples are: A: Specific Gravity 2.33; Unit Weight (lb/ft^3) Loose 89, Dry Rodded 106; Adsorption (%) 3.5; L.A. abrasion (% loss) 38.75 B: Specific Gravity 2.43; Unit Weight (lb/ft^3) Loose 97.2, Dry Rodded 114; Adsorption (%) 1.14; L.A. abrasion (% loss) 34.60	Permafrost may occur locally, particularly under alluvial fill in valley bottoms and on north-facing slopes. Weathered rock locally susceptible to moderate frost action.	Exposure predominantly on hill slopes renders it unsuitable for major structures. Road construction requires numerous cuts and fills. Schistose facies makes fair base course material without crushing. However, traffic and frost will break it down to silt. Gneissic facies good material for riprap, ballast, and coarse aggregate. If crushed, gneissic facies material also good for base course and road metal, fair for concrete aggregate.	Schistose facies easily excavated with power tools, may require little to moderate blasting. Gneissic facies may require additional blasting. May experience sliding and slumping along joint, cleavage and foliation planes.	Quarries present in Birch Hill and Approach Hill. Many potential sites for additional quarries, though most would require access roads through difficult terrain. Best rock in unit is near granitic rocks.
4 Basalt	Two minor outcrops of basalt on terrace face Stage Hill north of the Chena River steep slopes, relief is 80 m (260 ft).	Dark-gray and black or brownish olivine basalt closely jointed and deeply weathered, with local pillow or columnar structure. Palagonite present in pillow lavas. Rock may have an intersertal texture, with dominate minerals consisting of olivine, labradorite, pyroxene, iron, calcite, and tachylyte. Early tertiary period basalt deposited on a schistose erosional surface sequence includes both subaerial and submarine flows. Erosion during late tertiary time removed much of the material, leaving only two small outcrops in the Fairbanks area.	High bearing strength and low permeability. Engineering properties for two laboratory samples are: A: Specific Gravity 2.61; Unit Weight (lb/ft^3) Loose 92.0, Dry Rodded 101.0; Adsorption (%) 2.38; L.A. abrasion (% loss) 20.0 B: Specific Gravity 2.47; Unit Weight (lb/ft^3) Loose 90.0, Dry Rodded 109.2; Adsorption (%) 2.36; L.A. abrasion (% loss) 19.0	No permafrost locally, weathered basalt mildly susceptible to frost action.	Limited extent of this unit restricts uses to quarry sites. Pillow lavas excellent for subgrade, base course, or pervious fill without crushing. Columnar basalts may require crushing for most uses.	Pillow lavas easily excavated with power tools; columnar lavas require blasting.	Quarry presently in operation on Sage Hill, access good by dirt road.
5 Alluvial Fan, and Glacial Outwash Deposits	Smooth to gently rolling land slopes down from the Alaskan Range to the southern side of the Tanana floodplain, between the Tanana and Wood Rivers. The only breaks in the smooth slopes occur around the Blair Lakes, where metamorphic buttes project through the alluvium. During glacial epoch, glaciers of the Alaska Range may have approached within 80 km (50 mi) of Fairbanks. As glaciers retreated, floods of glacial outwash and alluvium entered Tanana lowlands.	Well sorted gray to brown sands, gravels and boulders; sand the dominant grain size north of Blair Lakes. Rock fragments range in size from 2.5 cm (1 in) to over 30 cm (12 in) derived from granite, conglomerate, schist, gabbro, diorite, quartz, chert, volcanics, and sandstone. Silt may overlie alluvium to a depth of 1.5 m (5 ft).	Bearing strength, permeability, and porosity are generally high.	Permafrost occurs locally, especially where there is a silt overburden. Coarser materials generally not susceptible to frost action.	Good bearing strength, extensive size, and level terrain make unit good site for multistructure facility or airfield if silt overburden is removed to prevent frost damage. Potentially good source of sand and gravel. Lack of accessibility in summer due to river crossing, marshes, and wet silts in floodplain diminish potential of area.	Easily excavated with power tools. Material will stand on moderate slopes.	No extractive operations at present. Difficulty of access a prime consideration in development of quarry sites.
6 Metavolcanic and Volcanoclastic Rock	Forms ridge tops across central part of Yukon Command Training Site, slopes moderate to steep. Associated with granites and metamorphic rocks.	Gray to greenish-gray porphyroblastic rock of undetermined composition, probably felsite; highly fractured, probably predates plutonism of cretaceous period.	No data.	Probably free of permafrost and only locally affected by frost action.	Limited to upland slopes, and, therefore, unsuited for most construction purposes. Use for riprap, fill, etc., should be contingent upon laboratory analyses of samples.	Excavation possible with power tools and minimum blasting.	No quarries present. Potential sites require access roads.
7 Windblown Silts	Windblown silts (loess) form gently rolling hillslopes and low rounded hills. Old, slightly subdued parallel gullies and ridges at right angles to contours are characteristic of most upper slopes. Recent gullies have steep side walls and vertical headwalls with a "catstep" shape.	Massive, homogeneous loess contains less than 10% clay. Silts are buff to tannish gray and exhibit characteristic vertical structure. Grains are angular and consist mostly of quartz, feldspar, and mica. Locally, loess may be cemented with iron oxide or may be calcareous. Since glacial tumes, loess has been deposited over most of the Ft Wainwright area on the accompanying graphic, it is shown where greater than 1 m (3 ft) deep.	Loess has high bearing strength when dry and in its original position, and very low strength when wet. Porosity and permeability poor to fair laterally and good vertically. Engineering properties for two loess samples are: A: Specific Gravity 2.81; Maximum Density (lb/ft3) 105.9; Theoretical Density (lb/ft3) 120.0; % Voids 8.78; Liquid Limit 27.5; Plastic Limit 22.6; Plasticity Index 5.2 B: Specific Gravity 2.60; Maximum Density (lb/ft3) 102.0; Theoretical Density (lb/ft3) 104.7; % Voids 9.7; Liquid Limit 24.7; Plastic Limit 22.9; Plasticity Index 1.8	No permafrost except where loess covers flat, poorly drained surfaces. Mildly susceptible or unsusceptible to frost action except in poorly drained areas, where frost action may be intense.	Source of fines and possible source of impervious fill. Provides good foundation for heated buildings if protection provided against gullying. Cuts for roads maintain a vertical slope; this is the most stable condition. Fills and graded slopes, however, destroy vertical structure of the loess and reworked material will behave as ordinary silt. Unsurfaced roads are unstable powdery when dry; plastic and sticky when wet.	Excavation easy with hand tools. Material is difficult to compact; maintains near vertical slopes.	No pits or quarries present. Best sites on mid-hill slopes where potential unit may be up to 660 m (200 ft) thick.
8 Muck	Muck (organic silt) occupies lower slopes and creek bottoms on the Yukon Command Training Site, and lower slopes around Blair Lakes. Silts form very gently sloping alluvial fans and colluvial slopes. Broad, alluviated creek valley bottoms contain small lakes.	Massive, homogeneous, unconsolidated, well-sorted silts of windblown origin with less than 10% clay. Locally rich in organic silt and larger organic fragments. Material has been retransported from original hillside sites of windblown deposition to lower slopes and valley bottoms by mudflows, gullying, and slopewash. Inorganic components are quartz, feldspar, and mica. Deposit incorporates large quantities of plant and animal remains in valley bottoms, and large oval areas of frozen peat.	Bearing strength high when dry or frozen, but very low if wet or thawed. Nearly impermeable. Engineering properties for two samples are: A: Specific Gravity 2.34; Maximum Density (lb/ft3) 108.0; Liquid Limit 29.7; Plastic Limit 23.0; Plasticity Index 6.7 B: Specific Gravity 2.00; Maximum Density (lb/ft3) 85.2; Liquid Limit 34.3; Plastic Limit 26.8; Plasticity Index 7.5	Depth to permafrost between 0.5 to 1.2 m (1.5 to 4 ft) on lower slopes and valley bottoms and up to 6 m (20 ft) near contact with loess. Permafrost from 1 m (3 ft) to at least 53 m (176 ft) thick; pinches out on upper slopes, and is continuous except under lakes and near loess deposits. Frost action intense.	Poor foundation material and unsuited for most engineering purposes. A source of fines and possible source of impervious fill.	Silts very difficult to excavate unless thawed. Blasting moderately successful. When thawed, viscous sediment slides into fill. excavations, except near loess or on low hills. There is great differential ground subsidence upon thawing of the permafrost, accompanied by the formation of ice-cored mounds 3. to 4.5 m (10 to 15 ft) in diameter and 0.3 to 3 m (1 to 10 ft) high, and thaw pits 1 to 10 m (3 to 30 ft) in diameter and 1.5 to 6 m (5 to 20 ft) deep. The material is difficult to compact.	Unsuited due to excavation difficulties.
9 Dune Sand	Level area of Quaternary sand dunes blanketed by up to 1 m (3 ft) of silt in a marshy area near the confluence of the Wood and Tanana Rivers.	Light yellowish-brown, well sorted, fine- to medium-grained rounded sand made up largely of white quartz.	Good bearing strength and excellent permeability.	Permafrost absent or only at considerable depth; sand has low susceptibility to frost action.	Dune sand has good bearing strength, but poor location and limited extent preclude use as a construction site. Good source of construction material if access could be provided.	Excavation easy with power tools, after silt overburden is removed.	No pits present. Future development will depend on feasibility of building access routes.
10 Mafic and Ultramafic Rock	Form gently rounded hill crests and slopes. Two areas of outcrop are: Low hills (Wood River Buttes) which protude from fan and outwash deposits east of the Wood River and local outcrops on spurs along the south fork of the Chena River.	Microcrystalline diorite and serpentinized peridotite make up the Wood River Buttes. Diorite contains 45% strongly zoned plagioclase laths with cores of sodic laboradorite and rims of sodic andesine, 5 to 20% pigeonitic augite, and 30 to 40% amphibole. Most augite occurs as cores in amphibole crystals. Mafic minerals locally altered to chlorite. Serpentinized rock, along the south fork of the Chena River, is 30 to 80% masses of bastite, antigorite, and chrysotile which surround relict grains of olivine, bronzite, and edenite. These intrusions were emplaced during the Devonian period.	Bearing strength only moderate in dipping strata; otherwise high.		Hilly nature and limited extent makes unit unsuitable for most construction purposes. Serpentine may be extracted for special purposes.	Weathered rock can be excavated with power tools; fresh rock may require some blasting.	No quarries present. Limited extent and lack of access routes makes future excavations impractical.

*ybp = years before present

FORT WAINWRIGHT, ALASKA

(INCLUDING THE YUKON COMMAND TRAINING SITE AND THE FAIRBANKS PERMAFROST STATION)

TERRAIN ANALYSIS

ENGINEERING GEOLOGY

MANY ENGINEERING USES

1. Floodplain alluvium

SOME ENGINEERING USES

2. Granitic rock
3. Metamorphic rock

FEW ENGINEERING USES

4. Basalt
5. Alluvial fan and glacial outwash deposits
6. Metavolcanic and volcanoclastic rock
7. Windblown silts
8. Muck
9. Dune sand
10. Mafic and ultramafic rock

CONSTRUCTION MATERIALS

Borrow pits (sand and gravel) and quarries, status unknown (many limited-volume, short term-use pits not shown)

NOTE: Numbers refer to entries in tables.

1:50,000 SHEET INDEX
Series Q701

Fairbanks D-4 IV	Fairbanks D-3 I	Fairbanks D-2 IV	Fairbanks D-1 I	Big Delta D-6 IV	Big Delta D-5 I	
Fairbanks C-4 III	Fairbanks C-3 II	Fairbanks C-2 III	Fairbanks C-1 II	Big Delta C-6 III	Big Delta C-5 II	3350
Fairbanks B-4 IV	Fairbanks B-3 I	Fairbanks B-2 IV	Fairbanks B-1 I	Big Delta B-6 IV	Big Delta B-5 I	3349
III	II	III	II	III	II	

3450 3449 3549

SAMPLE 10,000 METER GRID SQUARE

100,000 m SQUARE IDENTIFICATION: VG WG

GRID ZONE DESIGNATION: 6W

SAMPLE 1,000 METER REFERENCE

1. Read letters identifying the 100,000 meter square in which the point lies: VG
2. Read large numbers labeling the VERTICAL grid line left of point: 7
   Estimate tenths (1,000 meters) from grid line to point: 2
3. Read large number labeling the HORIZONTAL grid line below point: 5
   Estimate tenths (1,000 meters) from grid line to point: 4

Example: VG7254

WHEN REPORTING OUTSIDE THE GRID ZONE DESIGNATION AREA IN WHICH THE POINT LIES, PREFIX THE GRID ZONE DESIGNATION. Example: 6WVG7254

Scale 1:125,000

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 Meters

1 0 1 2 3 4 5 6 Statute Miles

CONTOUR INTERVAL 200 FEET
SUPPLEMENTARY CONTOURS 100 FEET

Prepared by the Defense Mapping Agency Hydrographic/Topographic Center, Washington, D.C. for the Terrain Analysis Center, U.S. Army Engineer Topographic Laboratories, Fort Belvoir, Virginia. September 1978.

F. SPECIAL PHYSICAL PHENOMENA

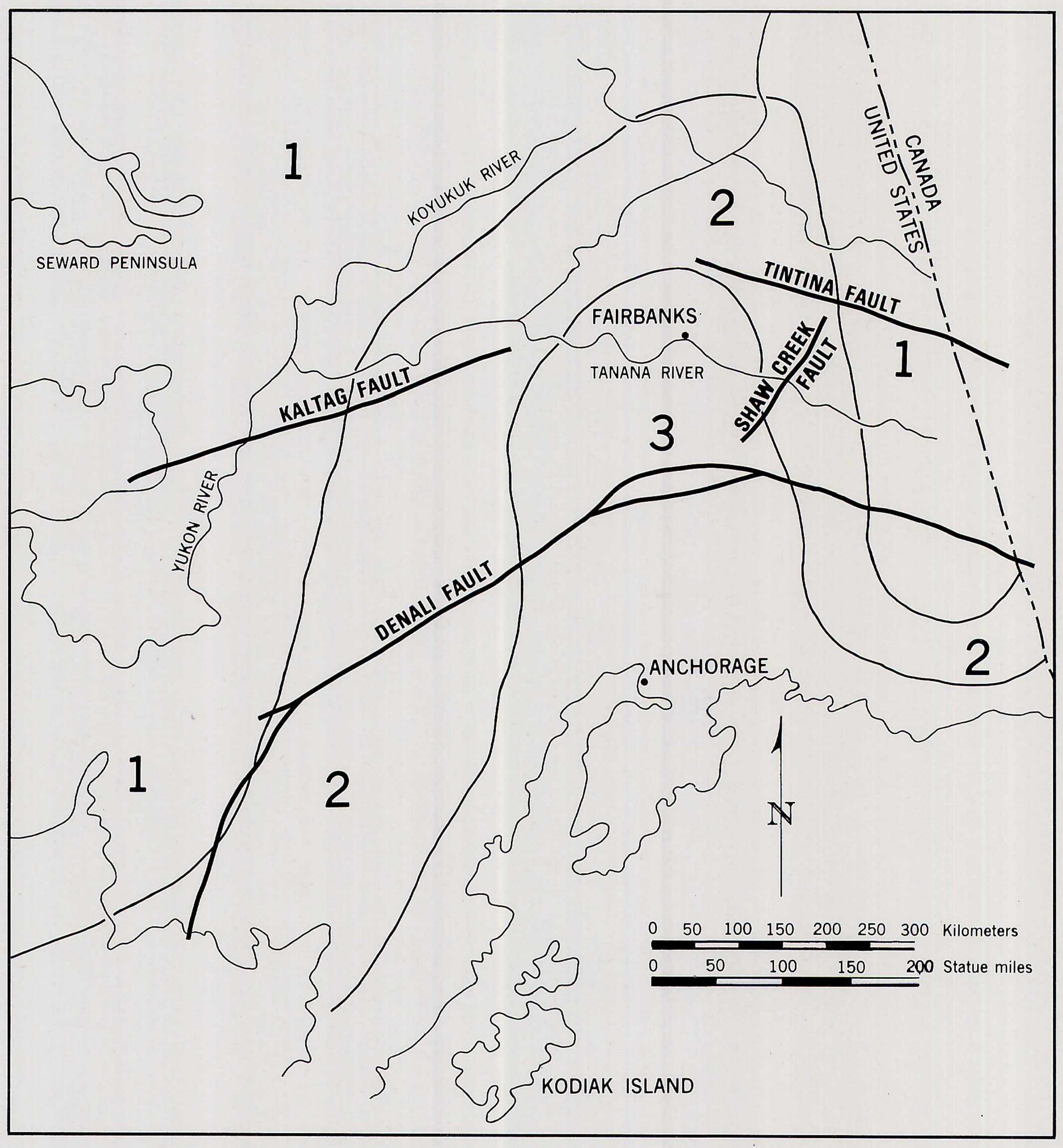
Major natural hazards and engineering problems which may be encountered on Fort Wainwright are earthquakes, permafrost, floods, and icings. The reservation is within Zone 3 of the National Seismic Risk Map for Alaska, an area in which there is a potential for major earthquake damage. Fault systems in the area include the Denali fault system, the Shaw Creek fault, the Kaltag fault system, and the Tintina fault. The Denali fault system is, 125 kilometers (78 miles) south of Fort Wainwright along the base of the Alaska Range; the Shaw Creek fault is just east of the reservation in the Big Delta area; the Kaltag fault system is 60 to 80 kilometers (37 to 50 miles) northwest; and the Tintina fault is 60 to 80 kilometers (37 to 50 miles) northeast. Occasional strong earthquakes have been recorded in the Fairbanks/Fort Wainwright area, as shown on the accompanying graphic.

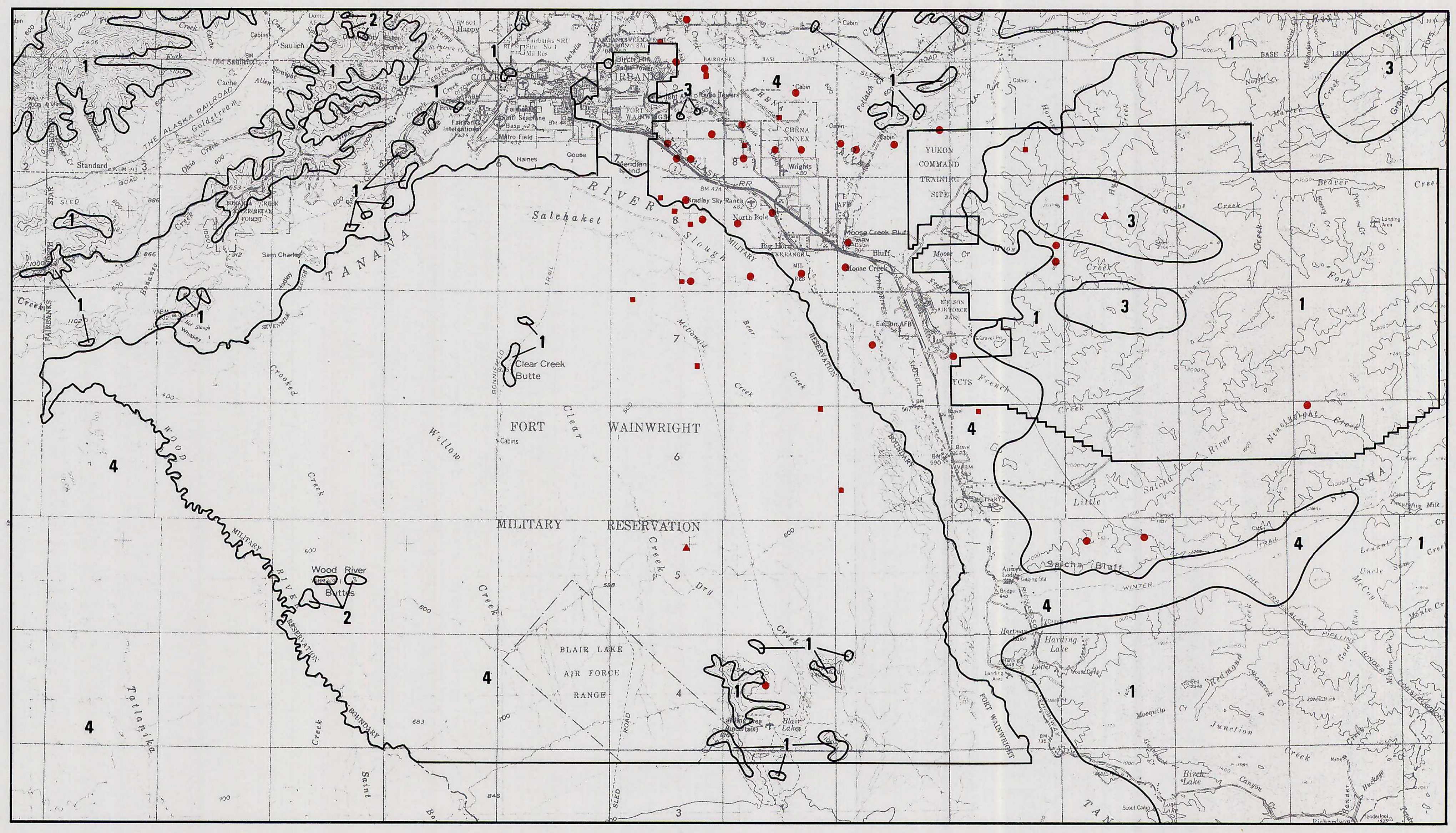
Permafrost (perennially frozen soil) and deep annual frost pose problems in any construction endeavor. Fort Wainwright is in the zone of discontinuous permafrost. Some areas are free of this hazard, but there is no sure way of predicting if a potential site is free of permafrost; drill samples must be taken to indentify a frost-free site. Frozen ground may be an extremely strong and stable foundation if it is insulated to maintain its frozen state. If, however, the permafrost is allowed to thaw, the soil becomes extremely weak and foundation failures are very common.

Icings occur during the winter months where water issuing from the ground freezes to form sheet-like masses. They commonly develop where a roadcut intersects the groundwater table above permafrost and seepage occurs. Icings may block culverts and, by diverting meltwaters, cause washouts in the spring. River icings which develop where rivers freeze to the bottom and water is forced out of the bed may cause extensive damage to bridges.

The Chena River floods periodically, causing problems in the Fort Wainwright cantonment area. The flood of 1967, probably the largest recorded, inundated 94 percent of Fairbanks. Since then, construction has begun on a series of dikes and dams to contain future floods.

NATIONAL SEISMIC RISK MAP (Alaska), including location of faults mentioned in text.





GENERAL GEOLOGY SEISMIC ACTIVITY OF STUDY AREA

SOURCE: RESOURCE PLANNING TEAM, 1974; U. S. DEPARTMENT OF COMMERCE, 1976; PEWE EL AL., 1966.

GENERAL GEOLOGY:
1. METAMORPHIC ROCK
2. METAVOLCANIC AND VOLCANOCLASTIC ROCK
3. GRANITE ROCK
4. FLOODPLAIN ALLUVIUM, GLACIAL OUTWASH, AND ALLUVIAL FAN DEPOSITS

SEISMIC ACTIVITY:
- ▲ -PRE-1960
- ● –1960'S
- ■ –1970'S

1. 22 JULY 1937, VIII MERCALLI SCALE
2. 16 OCT. 1947, VIII MERCALLI SCALE
3. 6 FEB. 1967, V MERCALLI SCALE

ALL OTHERS IV OR LESS ON MERCALLI SCALE. NUMBERS IN PARENTHESES INDICATE NUMBER OF SEISMIC EVENTS WITH SAME EPICENTER.

N

0 1 2 3 4 5 Kilometers

0 1 2 3 4 5 Statute miles

R2W, TI4N-range and township

G. VEGETATION

Three major vegetation types, forests, scrub, and wetlands, are significant to military training and operations at Fort Wainwright and the Yukon Command Training Site.

Forests, consisting of mixed evergreen needleleaf and deciduous broadleaf trees, compose 25 percent of the vegetation on Fort Wainwright and 91 percent on the Yukon Command Training Site. The predominant species are white spruce and balsam poplar. The forests on Fort Wainwright are situated primarily along the river terraces and floodplains; on the Yukon Command Training Site, extensive forests occur throughout.

Scrub/highbrush compose 64 percent of the Fort Wainwright Reservation and only 6 percent of the Yukon Command Training Site. Species vary from small trees, to brush, to grassland, with trees and brush more prevalent along the stream channels. The high brush areas are subject to flooding during thaw periods.

Wetlands compose only 10 percent of Fort Wainwright and 3 percent of the Yukon Command Training Site. Wetlands consist of muskegs/bogs, which generally have standing water, and moist tundra. The moist tundra areas generally occur on ridges and rubble slopes, and at higher elevations.

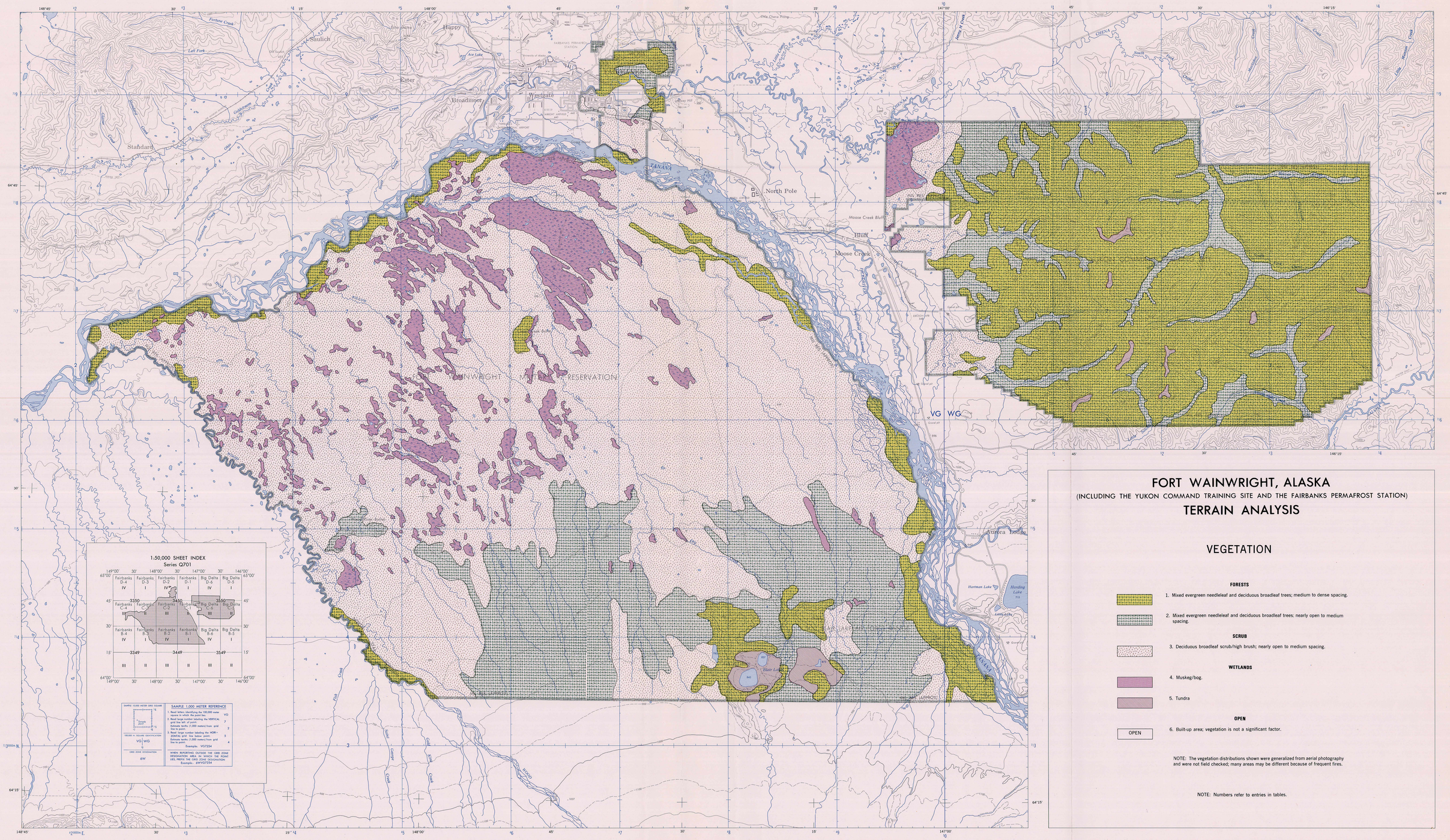
Built-up areas and open water areas cover the remainder of the reservation.

The vegetation patterns are subject to major changes due to fire, severe climatic conditions and permafrost.

The vegetation type which affords the best cover and concealment possibilities for foot troops and vehicles are the dense stands of mixed forests, these occur primarily on the Yukon Command Training Site.

The location and extent of vegetation types are shown on the accompanying vegetation map. Descriptive details of each map unit are included in the table below.

MAP UNIT	DESCRIPTION	DISTRIBUTION	REMARKS	COVER	CONCEALMENT
1. Mixed evergreen needleleaf and deciduous broadleaf trees; medium to dense spacing.	Mixed evergreen needleleaf and deciduous broadleaf trees; 50–100% crown cover; each stand contains roughly equal distribution of species. Bottom land spruce-poplar forest; dominant trees include white spruce locally mixed with balsam poplar; white spruce heights 27.4 m (90 ft), diameters 40.6 cm (16 in); balsam poplar averages 21.0 to 24.1 m (69 to 79 ft) in height and 30.5 to 45.7 cm (12 to 18 in) in diameter; trees spaced 3.0 to 6.1 m (10 to 20 ft) apart.	Covers only a small portion (7%) of Fort Wainwright and is primarily located along the Tanana River that borders the reservation; the best stands are found on low river terraces and level floodplains.	Potential areas for commercial timber; potential has been severely reduced due to fire.	Cover for foot troops from flat-trajectory fire of small arms is good.	Concealment from aerial and ground observation is good for foot troops and vehicles throughout the year.
	Upland spruce-hardwood forest; dominant trees include white spruce, aspen, birch, and balsam poplar; the white spruce is usually replaced by black spruce on poorly drained flat areas and north-facing slopes; white spruce averages 11.8 to 24.1 m (39 to 79 ft) in height and up to 38.1 cm (15 in) in diameter; the larger birches and aspen trees reach heights of 14.9 m (49 ft) and diameters of 25.4 cm (10 in); average diameters are usually 10.2 cm (4 in) or less; trees generally closely spaced, 0.9 to 3.9 m (3 to 13 ft) apart. Undergrowth usually quite dense consisting of willows, alders, roses, dogwoods, currants, Labrador tea, and cranberry; forest floor consists of mosses, ferns, fireweed, horsetails, lichens, and herbs.	Covers 74% of the Yukon Command Training Site and is commonly found on upland type terrain at the higher elevations; covers only a small portion of Fort Wainwright and can be found in the Blair Lakes and Creek Butte areas.	Many windblown trees, due to shallow, moist soils, can be found on the north-facing slopes.	Cover for foot troops from flat-trajectory fire of small arms is good.	Concealment from aerial and ground observation is good for foot troops and vehicles throughout the year.
2. Mixed evergreen needleleaf and deciduous broadleaf trees; nearly open to medium spacing.	Mixed evergreen needleleaf and deciduous broadleaf trees; 10–50% crown cover density; each stand contains roughly equal distribution of species; dominant trees include black spruce, tamarack, paper birch, aspen, balsam poplar, and white spruce; up to 14.9 (49 ft) in height and 20.3 cm (8 in) in diameter; white spruce and balsam poplar generally somewhat taller in height and larger in diameter than the other trees; trees generally widely spaced; undergrowth includes willows, Labrador tea, rose, dwarf birch, alders, cotton grass, fireweed, horsetail, lichens, ferns, and mosses.	Covers 17% of the Yukon Command Training Site and can be found in and along the stream valleys as well as on some of the north-facing slopes; on Fort Wainwright this unit covers 18% of the area and is primarily located in the southeast portion of the reservation. Only vegetation on the Fairbanks Permafrost Station.		Cover for foot troops from flat-trajectory fire of small arms is fair depending on truck diameters.	Concealment from aerial and ground observation is fair for foot troops in most areas all year; concealment from aerial and ground observation for vehicles is generally poor.
3. Deciduous broadleaf scrub/ high brush; nearly open to medium spacing.	High brush; 10–50% crown cover density; dominant species are willow, alders, dogwoods, berry bushes, roses, horsetails, and ferns; shrub heights up to 2.1 m (7 ft); scattered trees up to 4.5 m (15 ft) in height; brush and shrubs generally more dense along major stream channels.	Covers only 6% of the Yukon Command Training Site and is located primarily along the western edge. Covers 64% of Fort Wainwright, most extensive area is south of the Tanana River in the central and northwest portions of the reservation.		Cover for foot troops from flat-trajectory fire of small arms is poor.	Concealment from aerial and ground observation is generally poor for both foot troops and vehicles and will depend mainly on the density and height of the shrubs which could afford limited concealment in some areas.
4. Muskeg/bog	Shrub type wetlands; characterized primarily by water, either as standing or the result of a high water table; dominant species are black spruce, willows, sedges, shrubs, herbs, and grasses; heights vary up to 1.2 m (4 ft); aquatic herbaceous vegetation (sphagnum, rushes, and lilies) usually occuring where conditions are too wet for tree growth.	Covers only a very small portion (2%) of the Yukon Command Training Site, primarily the extreme northwestern corner; covers 9% of Fort Wainwright, primarily south of the Tanana River in the central and northwestern portion of the reservation.	Some areas develop from small thaw lakes. Frequently with tussocks and deep accumulations of organic material.	No cover for foot troops.	No concealment for foot troops or vehicles.
5. Tundra	Tundra; grass areas with local patches of low, dwarf, or procumbent shrubs up to 0.9 m (3 ft) in height; dominant species include lichens, grasses, herbs and sedges; associated species include dwarf arctic birch, resin birch, alder, berry bushes, Labrador tea, and currents.	Covers only small portions of both the Training Site (2%) and Fort Wainwright (1%), usually occurs on ridges and rubble slopes; in the Yukon Command Training Site it can be found on scattered ridges while on Fort Wainwright it is primarily located around the Blair Lakes region.		No cover for foot troops.	No concealment for foot troops or vehicles.



FORT WAINWRIGHT, ALASKA

(INCLUDING THE YUKON COMMAND TRAINING SITE AND THE FAIRBANKS PERMAFROST STATION)

TERRAIN ANALYSIS

VEGETATION

FORESTS

1. Mixed evergreen needleleaf and deciduous broadleaf trees; medium to dense spacing.
2. Mixed evergreen needleleaf and deciduous broadleaf trees: nearly open to medium spacing.

SCRUB

3. Deciduous broadleaf scrub/high brush; nearly open to medium spacing.

WETLANDS

4. Muskeg/bog.
5. Tundra

OPEN

OPEN 6. Built-up area; vegetation is not a significant factor.

NOTE: The vegetation distributions shown were generalized from aerial photography and were not field checked; many areas may be different because of frequent fires.

NOTE: Numbers refer to entries in tables.

Prepared by the Defense Mapping Agency Hydrographic/Topographic Center, Washington, D.C. for the Terrain Analysis Center, U.S. Army Engineer Topographic Laboratories, Fort Belvoir, Virginia. September 1978.

H. CLIMATE

Fort Wainwright is in the Tanana Valley of interior Alaska. The area has a continental climate and is well sheltered from maritime influences by mountain ranges on practically all sides. The sun is above the horizon from 18 to 21 hours each day during the months of June and July. During this period, daily average maximum centigrade temperatures reach the lower 20's (70° F). Temperatures of 27° C (80° F) or higher occur on approximately 10 days each summer, with extreme highs of 32° C (90° F) or more having been recorded in each of the months of May through August. The temperature reaches its peak, on average, between June 27 and July 4. Conversely, during the period from November to March, when the sunshine period ranges from 10 hours to less than 4 hours per day, the lowest temperature readings fall below -17° C (0° F). Extremely cold temperatures of -40° C (-40° F) and colder occur on the average on 14 days each winter, with record extremes of near or below -50° C (-60° F) during each of the three midwinter months. January 5 to January 18 is the period of lowest average temperatures.

Total annual precipitation averages approximately 300 millimeters (12 inches). Precipitation during summer is in the form of rain showers. The frequency and intensity of these rain showers tends to increase as the summer progresses, building to a maximum in August. There is a noticeable decline in precipitation from September through December. Snowfall averages 142.5 centimeters (56.1 inches) per year. The record seasonal snowfall of 427 centimeters (168 inches) occurred during the winter of 1970–71. For purposes of comparison, at nearby Fairbanks International Airport a record total of 145.7 inches or 370 centimeters of snow fell in 1970–71, and at this same location the lowest annual snowfall ever recorded was 30.5 centimeters or 12.0 inches in 1918–19. Snowfalls of 10 centimeters (4 inches) or more in a day occur only 3 times during the average winter, and blizzard conditions are almost never experienced. There is a cover of snow on the ground for more than 6 months of the year; the maximum snow depth occurs in February, when it averages .61 meters (2 feet).

Winters in the Fort Wainwright/Fairbanks area are characterized by relatively calm, clear weather and a high frequency (80 percent) of surface temperature inversions. This results in high winter pollution potential and ice fog formation which creates serious visibility problems.

Ice fog is produced by water vapor discharged during cold weather of -32° C (-25° F) or lower. Most of the vapor comes from automobiles, power plants and domestic heating. The fog is usually 9 meters (30 feet) thick, seldom more than 31 meters (100 feet) thick, although thicknesses of 50 meters (160 feet) have been observed directly over Fairbanks during long cold spells.

Wind velocity for the Fort Wainwright/Fairbanks area is unusually low. Records from the airport station indicate winds are calm (4 knots or less) approximately 60 percent of the time. The overall mean monthly wind speed averages 4.3 knots (8.0 miles per hour). The prevailing direction is from the north except for the months of June and July, when winds shift to the southwest.

The relationship between heat loss and the cooling power of different wind and temperature combinations is shown below. Equivalent wind chill temperature relates a particular wind and temperature combination to whatever temperature would produce the same loss of heat at four miles per hour, the normal speed of a person walking vigorously.

The average last date of freezing temperature in the spring is May 21, and the average first frost in the fall is August 30. The length of the growing season averages 100 days.

See the following tables for summary of climatic and ephemerical data, and an equivalent wind chill temperatures chart.

CLIMATIC SUMMARY[1]

FORT WAINWRIGHT AAF/FAIRBANKS Latitude N 64°50′ W 147°37′ Elevation 137 m (448 ft)

PARAMETER DESCRIPTION	UNIT OF MEASURE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	YEARS OF RECORD
Absolute maximum temperature	°C	5.5	10.0	13.3	23.9	33.3	35.0	37.2	32.2	29.4	19.4	12.2	14.4	37.2	43
Absolute maximum temperature	°F	42	50	56	75	92	95	99	90	85	67	54	58	99	
Mean daily maximum temperature	°C	−18.9	−11.7	−5.0	5.6	15.0	21.7	22.2	18.9	12.2	1.7	−11.1	−17.2	2.8	44
Mean daily maximum temperature	°F	−2	11	23	42	59	71	72	66	54	35	12	1	37	
Mean daily minimum temperature	°C	−28.9	−23.3	−20.0	−8.3	1.7	7.8	8.9	6.7	0.6	−7.8	−20.6	−26.7	−8.9	44
Mean daily minimum temperature	°F	−20	−10	−4	17	35	46	48	44	33	18	−5	−16	16	
Absolute minimum temperature	°C	−54.4	−50.0	−48.9	−35.6	−17.8	−2.2	−1.1	−7.2	−11.7	−33.3	−47.8	−50.6	−54.4	44
Absolute minimum temperature	°F	−66	−58	−56	−32	0	28	30	19	11	−28	−54	−59	−66	
Mean number days with maximum temperature ≥90° F (32.2° C)	days	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.5	13
Mean number days with maximum temperature ≥70° F (21.1° C)*	days	0	0	0	0	3	18	21	10	1	0	0	0	53	14
Mean number days with maximum temperature ≥32° F (0.0° C)*	days	31	26	23	6	#	0	0	0	#	17	28	30	161	14
Mean number days with minimum temperature ≤32° F (0.0° C)	days	31	28	31	27	6	0	0	#	9	29	30	31	221	13
Mean number days with minimum temperature ≤0° F (−17.8° C)*	days	27	24	19	2	#	0	0	0	0	4	19	26	122	14
Normal heating degree-days (base 65° F/18.3° C)*	°C-days	1324	1050	955	602	305	117	82	169	343	686	1037	1298	7969	30
Normal heating degree-days (base 65° F/18.3° C)*	°F-days	2384	1890	1720	1083	549	211	148	304	618	1234	1866	2337	14344	
Normal cooling degree-days (base 65° F/18.3° C)*	°C-days	0	0	0	0	0	17	23	6	0	0	0	0	46	13
Normal cooling degree-days (base 65° F/18.3° C)*	°F-days	0	0	0	0	0	28	42	10	0	0	0	0	80	
Mean dew point temperature	°C	−26.7	−23.9	−16.7	−7.2	0.6	7.2	10.0	8.9	2.8	−7.2	−17.2	−26.7	−7.8	13
Mean dew point temperature	°F	−16	−11	2	19	33	45	50	48	37	19	1	−16	18	
Mean monthly precipitation	mm	22.86	12.70	17.78	7.62	15.24	33.02	48.26	53.34	33.02	20.32	17.78	15.24	297.18	35
Mean monthly precipitation	in.	0.9	0.5	0.7	0.3	0.6	1.3	1.9	2.1	1.3	0.8	0.7	0.6	11.7	
Absolute maximum monthly precipitation*	mm	170.4	53.3	94.5	58.4	44.5	89.4	136.9	174.8	142.5	86.4	118.1	58.2	475.7	72
Absolute maximum monthly precipitation*	in.	6.71	2.10	3.72	2.30	1.75	3.52	5.39	6.88	5.61	3.40	4.65	2.29	18.73	
Absolute minimum monthly precipitation*	mm	0.3	0.0	T	T	T	4.8	10.2	10.2	3.8	T	T	T	141.0	72
Absolute minimum monthly precipitation*	in.	0.01	0.00	T	T	T	0.19	0.40	0.40	0.15	T	T	T	5.55	
Absolute maximum 24-hour precipitation*	mm	14.7	24.6	23.4	7.9	22.4	38.6	41.4	87.9	30.7	56.4	21.3	31.8	87.9	26
Absolute maximum 24-hour precipitation*	in.	0.58	0.97	0.92	0.31	0.88	1.52	1.63	3.42	1.21	2.22	0.84	1.25	3.42	
Mean number days with precipitation ≥0.1 in. (2.5 mm)	days	3	2	2	1	2	3	4	4	3	2	2	2	30	35
Mean number days with precipitation ≥0.01 in. (0.25 mm)	days	7	7	7	5	6	10	12	12	9	10	9	8	102	35
Mean number days with thunderstorms	days	0	0	0	0	1	4	4	1	0	0	0	0	10	22
Mean number days with occurrence of hail	days	0.0	0.0	0.0	0.1	0.4	0.4	0.2	0.0	0.1	0.0	0.0	0.0	1.2	14
Mean monthly snowfall*	mm	284.5	231.1	195.6	81.3	15.2	0.0	0.0	0.0	22.9	233.7	281.9	276.9	1623.1	63
Mean monthly snowfall*	in.	11.2	9.1	7.7	3.2	0.6	0.0	0.0	0.0	0.9	9.2	11.1	10.9	63.9	
Absolute maximum monthly snowfall*	mm	1666.2	1094.7	840.7	637.5	119.4	30.5	T	76.2	198.1	665.5	1371.6	850.9	3700.8	63
Absolute maximum monthly snowfall*	in.	65.6	43.1	33.1	25.1	4.7	1.2	T	3.0	7.8	26.2	54.0	33.5	145.7	
Absolute maximum 24-hour snowfall*	mm	393.7	510.5	320.0	274.3	114.3	30.5	T	T	177.8	317.5	370.8	373.4	510.5	26
Absolute maximum 24-hour snowfall*	in.	15.5	20.1	12.6	10.8	4.5	1.2	T	T	7.0	12.5	14.6	14.7	20.1	
Mean number days with occurrence of snow and/or sleet	days	17	14	13	9	2	0	0	0	4	16	18	19	112	14
Mean number days with snowfall ≥1.5 in. (38.1 mm)	days	3	2	1	#	#	0	0	0	#	2	1	3	13	13
Mean number days with snowfall ≥1.0 in. (25.4 mm)	days	3	3	3	1	#	0	0	0	#	4	4	4	22	25
Mean percent relative humidity	%	75	75	71	63	57	61	68	73	75	79	80	75	71	13
Mean percent relative humidity* (at 0200 LST)	%	68	68	70	74	77	82	88	91	88	83	72	70	78	31
(at 0800 LST)	%	68	71	70	63	57	62	72	79	84	83	74	72	71	20
(at 1400 LST)	%	68	64	54	57	42	45	52	57	59	69	72	70	58	31
(at 2000 LST)	%	70	69	67	62	54	57	66	77	80	81	74	71	69	20
Mean pressure altitude	m	117.1	119.5	120.4	138.7	141.8	140.9	140.9	149.1	165.2	187.2	165.2	150.0	144.8	
Mean pressure altitude	ft	384	392	395	455	465	462	462	489	542	614	542	492	475	
Vapor pressure	cm Hg	0.05	0.08	0.13	0.28	0.48	0.76	0.91	0.86	0.56	0.28	0.10	0.05	0.25	13
Vapor pressure	in. Hg	0.02	0.03	0.05	0.11	0.19	0.30	0.36	0.34	0.22	0.11	0.04	0.02	0.10	
Prevailing direction of wind	direction	N	N	N	N	N	SW	SW	N	N	N	N	N	N	
Mean wind speed	kmph	4.4	5.9	7.6	9.8	11.5	10.7	9.8	9.1	9.1	8.1	5.9	4.6	8.0	25
	mph	2.8	3.7	4.7	6.1	7.1	6.7	6.1	5.6	5.6	5.1	3.7	2.9	4.9	
	knots	2.4	3.2	4.1	5.3	6.2	5.8	5.3	4.9	4.9	4.4	3.2	2.5	4.3	
Extreme wind speed (peak gust)*	kmph	53.7	61.1	74.0	57.4	57.4	74.0	53.7	62.9	55.5	74.0	64.8	68.5	74.0	25
	mph	29	33	40	31	31	40	29	34	30	40	35	37	40	
	knots	25.2	28.7	34.8	26.9	26.9	34.8	25.2	29.5	26.1	34.8	30.4	32.2	34.8	

H. CLIMATE (Continued)

PARAMETER DESCRIPTION		UNIT OF MEASURE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	YEARS OF RECORD
Percent frequency surface wind speed ≥ 28 knots (32.2 mph, 51.9 kmph)		%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	13
Percent frequency surface wind speed ≥ 17 knots (19.6 mph, 31.5 kmph)		%	0.5	0.8	0.6	0.5	1.2	1.4	0.4	0.5	0.3	0.6	0.4	0.6	0.7	13
Mean number days with occurrence of blowing snow		days	0.6	0.9	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.2	3.1	14
Mean number days with occurrence of dust and/or sand		days	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.5	14
Mean number days with surface wind speed ≥ 17 knots (19.6 mph, 31.5 kmph) and no precipitation	(at 1400 LST)	days	0.3	0.3	0.2	0.2	0.7	0.7	0.5	0.5	0.2	0.2	0.1	0.2	4.1	13
	(at 2000 LST)	days	0.0	0.1	0.3	0.2	0.3	0.3	0.1	0.3	0.0	0.1	0.0	0.3	2.0	
	(at 0200 LST)	days	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	1.1	
	(at 0800 LST)	days	0.1	0.1	0.2	0.1	0.3	0.3	0.1	0.1	0.1	0.3	0.3	0.2	2.1	
Mean number days with surface wind speed 4 – 10 knots (4.6 – 11.5 mph, 7.4 – 18.5 kmph) and temperature 33 – 89° F (0.6 – 31.7° C) and no precipitation	(at 1400 LST)	days	0.0	0.3	3.9	11.3	17.1	18.0	17.1	13.9	12.0	5.6	1.1	0.0	100.3	13
	(at 2000 LST)	days	0.0	0.0	0.5	8.8	17.4	16.2	13.7	11.8	12.1	3.1	0.7	0.0	84.3	
	(at 0200 LST)	days	0.0	0.0	0.1	2.9	10.7	10.1	10.3	9.7	8.3	3.5	0.8	0.0	56.4	
	(at 0800 LST)	days	0.0	0.1	0.3	5.1	11.6	11.4	8.6	9.3	8.2	2.0	0.7	0.0	57.3	
Average daily solar radiation		langleys	16	72	214	376	469	512	445	322	190	83	28	6	228	33
Mean cloudiness		tenths	6.1	5.8	5.5	6.1	6.9	7.4	7.4	7.7	7.7	7.3	6.7	6.5	6.8	14
Mean number days with occurrence of visibility ≤ 0.5 mi (0.8 km)		days	7.1	5.0	1.1	0.1	0.4	0.4	1.3	1.6	1.7	1.4	3.5	5.4	29.0	13
Percent frequency ceiling ≤ 5000 ft (1524 m) or visibility ≤ 5 mi (8.0 km)		%	43.1	35.5	15.4	12.2	14.6	17.1	24.9	26.3	26.5	33.8	36.0	43.6	27.4	13
Percent frequency ceiling ≤ 1500 ft (457.2 m) or visibility ≤ 3 mi (4.8 km)	(for 0000–0200 LST)	%	29.0	22.0	5.1	1.9	2.0	1.9	7.6	7.4	6.2	14.0	18.3	22.9	11.5	13
	(for 0300–0500 LST)		28.3	24.6	7.3	3.3	3.4	4.9	11.7	15.1	9.7	13.3	18.4	22.5	13.5	
	(for 0600–0800 LST)		29.6	27.4	8.1	4.6	4.7	6.4	15.1	19.2	15.6	17.8	19.2	27.7	15.9	
	(for 0900–1100 LST)		33.2	26.6	5.1	3.1	2.9	3.2	11.2	13.3	13.8	16.8	18.6	27.5	14.6	
	(for 1200–1400 LST)		28.0	12.3	3.9	2.2	1.2	2.1	5.4	5.4	8.9	12.4	15.7	27.7	10.4	
	(for 1500–1700 LST)		27.4	14.4	4.1	1.4	1.3	0.8	3.0	3.1	4.9	11.7	19.5	27.8	10.0	
	(for 1800–2000 LST)		28.4	17.2	4.9	1.4	1.3	0.8	3.9	3.0	5.2	13.8	17.0	24.8	10.1	
	(for 2100–2300 LST)		28.2	18.4	3.7	1.8	2.0	1.5	3.9	4.8	5.5	12.0	17.1	21.6	10.0	
Percent frequency ceiling ≤ 300 ft (91.4 m) or visibility ≤ 1 mi (1.6 km)	(for 0000–0200 LST)	%	11.9	6.9	1.0	0.0	0.4	0.1	1.8	1.5	1.6	2.0	4.8	8.2	3.4	13
	(for 0300–0500 LST)		10.6	9.2	1.5	0.3	1.1	0.7	3.1	4.4	3.7	2.2	5.4	7.0	4.1	
	(for 0600–0800 LST)		12.5	13.5	3.0	0.2	0.4	0.1	2.0	3.2	4.8	2.8	3.9	8.3	4.6	
	(for 0900–1100 LST)		16.8	11.6	0.4	0.0	0.1	0.0	0.5	1.0	0.7	2.2	4.6	12.6	4.2	
	(for 1200–1400 LST)		15.0	2.7	0.5	0.1	0.2	0.0	0.4	0.5	0.4	1.1	3.4	11.7	3.0	
	(for 1500–1700 LST)		11.0	2.5	0.5	0.0	0.1	0.0	0.7	0.4	0.4	0.7	2.5	9.6	2.4	
	(for 1800–2000 LST)		10.3	4.2	0.3	0.0	0.1	0.0	0.7	0.4	0.5	0.5	2.2	7.7	2.2	
	(for 2100–2300 LST)		10.3	6.2	0.4	0.2	0.2	0.0	0.8	0.2	0.6	1.3	3.1	6.3	2.5	
Mean number days with sky cover ≤ 30 percent and visibility ≥ 3 mi (4.8 km)	(at 14 LST)	days	6.7	8.1	10.8	7.4	4.2	2.6	2.7	2.0	2.6	4.5	4.1	3.6	59.3	13
	(at 20 LST)		7.8	7.4	11.4	8.1	5.2	3.2	3.6	3.6	4.1	7.2	6.2	4.7	72.5	
	(at 02 LST)		8.9	7.9	14.1	11.6	7.2	3.8	4.1	4.9	7.6	8.4	7.3	6.9	92.7	
	(at 08 LST)		6.7	5.5	9.2	7.1	6.7	4.6	4.6	3.8	3.7	3.7	4.4	5.7	65.7	
Mean number days with ceiling ≥ 1000 ft (304.8 m) and visibility ≥ 3 mi (4.8 km)	(at 14 LST)	days	23.1	25.3	29.7	29.4	30.7	29.8	30.0	30.2	29.2	28.2	25.0	22.1	332.7	13
	(at 20 LST)		22.5	23.4	29.7	29.7	30.7	29.6	30.2	30.2	28.7	28.1	25.1	23.9	331.8	
	(at 02 LST)		22.2	22.1	29.7	29.4	30.6	29.5	28.6	28.6	28.3	27.3	25.1	24.1	325.5	
	(at 08 LST)		22.2	19.9	28.6	29.0	30.2	29.4	27.4	26.8	25.7	26.1	24.7	23.8	313.8	
Mean number days with ceiling ≥ 2000 ft (609.6 m) and visibility ≥ 3 mi (4.8 km) and surface wind ≤ 10 knots (11.5 mph, 18.5 kmph)	(at 14 LST)	days	21.5	23.0	26.4	25.2	22.7	23.1	23.9	25.3	24.2	22.6	22.6	20.6	281.1	13
	(at 20 LST)		20.8	21.5	26.7	26.9	25.7	25.8	27.2	28.4	26.2	23.9	23.1	22.7	298.9	
	(at 02 LST)		20.5	20.0	26.7	27.3	28.6	27.8	27.0	26.4	26.2	23.5	22.9	22.7	299.6	
	(at 08 LST)		19.7	18.0	26.4	26.5	26.3	24.5	24.0	23.0	23.2	22.7	22.9	22.7	279.9	
Mean number days with ceiling ≥ 2500 ft (762.0 m) and visibility ≥ 3 mi (4.8 km)	(at 14 LST)	days	21.0	24.1	28.8	28.7	30.2	28.9	28.6	27.9	26.3	25.1	23.1	20.7	313.4	13
	(at 20 LST)		20.4	21.0	28.7	29.1	30.2	29.5	29.1	29.0	27.6	24.9	23.1	22.1	315.7	
	(at 02 LST)		20.6	20.6	28.6	28.8	30.0	28.3	26.7	26.9	27.0	24.7	23.3	22.4	307.9	
	(at 08 LST)		20.2	18.6	27.6	28.1	28.6	26.6	24.8	23.4	24.0	23.1	23.1	22.6	290.7	
Mean number days with ceiling ≥ 6000 ft (1828.8 m) and visibility ≥ 3 mi (4.8 km)	(at 14 LST)	days	18.8	20.9	26.3	25.6	20.8	18.8	20.6	21.3	20.6	20.2	19.1	17.3	250.3	13
	(at 20 LST)		18.0	18.3	26.1	25.9	26.3	23.8	23.1	22.2	21.6	19.6	18.5	17.3	260.7	
	(at 02 LST)		17.3	16.7	25.1	25.1	25.8	24.6	21.8	20.6	20.9	19.6	18.8	18.5	254.8	
	(at 08 LST)		17.0	15.5	24.6	25.5	25.0	23.1	20.3	20.2	19.1	18.1	18.8	18.2	245.4	
Mean number days with ceiling ≥ 10,000 ft (3048.0 m) and visibility ≥ 3 mi (4.8 km)	(at 14 LST)	days	15.1	17.7	23.8	22.7	15.1	14.6	15.6	15.9	15.8	16.2	14.3	12.6	199.4	13
	(at 20 LST)		14.7	15.0	22.0	21.8	19.6	16.8	17.9	15.0	15.2	16.3	14.3	13.9	202.5	
	(at 02 LST)		14.5	14.4	21.4	20.9	19.4	16.6	14.7	13.6	14.6	16.6	15.1	14.7	196.5	
	(at 08 LST)		13.6	11.8	20.7	21.0	20.4	18.0	15.7	14.7	14.2	14.0	14.2	13.6	191.9	

[1] LST = Local Standard Time; T = Trace; # = Less than 0.5

* Data derived from Fairbanks International Airport (latitude 64°49'N, longitude 147°52'W, elevation 436ft or 132.9 m), approximately 7 miles W of Fort Wainwright.

TABLE H-2
EPHEMERIS FORT WAINWRIGHT, (ALASKA–HAWAII STANDARD TIME)

DATE	NAUTICAL TWILIGHT BEGINNING	NAUTICAL TWILIGHT END	SUNRISE	SUNSET	DATE	NAUTICAL TWILIGHT BEGINNING	NAUTICAL TWILIGHT END	SUNRISE	SUNSET	DATE	NAUTICAL TWILIGHT BEGINNING	NAUTICAL TWILIGHT END	SUNRISE	SUNSET	DATE	NAUTICAL TWILIGHT BEGINNING	NAUTICAL TWILIGHT END	SUNRISE	SUNSET
January 1	0721	1627	0954	1355	April 1	0310	2042	0508	1843	July 1	////	////	0110	2237	October 1	0413	1905	0559	1719
January 11	0714	1643	0936	1421	April 11	0218	2130	0431	1914	July 11	////	////	0138	2211	October 11	0444	1829	0630	1643
January 21	0700	1705	0910	1454	April 21	0107	2241	0354	1946	July 21	////	////	0211	2140	October 21	0513	1756	0701	1608
February 1	0637	1732	0837	1533	May 1	////	////	0318	2020	August 1	////	////	0249	2102	November 1	0544	1723	0738	1529
February 11	0611	1800	0803	1607	May 11	////	////	0242	2054	August 11	////	////	0323	2026	November 11	0610	1658	0812	1457
February 21	0541	1829	0729	1641	May 21	////	////	0208	2129	August 21	0059	2239	0355	1949	November 21	0635	1637	0846	1426
March 1	0515	1853	0700	1707	June 1	////	////	0133	2207	September 1	0216	2121	0430	1909	December 1	0655	1623	0918	1401
March 11	0438	1925	0624	1738	June 11	////	////	0107	2235	September 11	0301	2030	0500	1832	December 11	0711	1616	0944	1343
March 21	0359	1959	0548	1809	June 21	////	////	0057	2247	September 21	0339	1945	0530	1756	December 21	0720	1617	0958	1339

//// – Nautical Twilight is continuous.

TABLE H-3
EQUIVALENT WIND CHILL TEMPERATURES

WIND SPEED MILES PER HOUR	COOLING POWER OF WIND EXPRESSED AS "EQUIVALENT CHILL TEMPERATURE" TEMPERATURE (°F)																				
CALM	40	35	30	25	20	15	10	5	0	–5	–10	–15	–20	–25	–30	–35	–40	–45	–50	–55	–60
	EQUIVALENT CHILL TEMPERATURE																				
5	35	30	25	20	15	10	5	0	–5	–10	–15	–20	–25	–30	–35	–40	–45	–50	–55	–65	–70
10	30	20	15	10	5	0	–10	–15	–20	–25	–35	–40	–45	–50	–60	–65	–70	–75	–80	–90	–95
15	25	15	10	0	–5	–10	–20	–25	–30	–40	–45	–50	–60	–65	–70	–80	–85	–90	–100	–105	–110
20	20	10	5	0	–10	–15	–25	–30	–35	–45	–50	–60	–65	–75	–80	–85	–95	–100	–110	–115	–120
25	15	10	0	–5	–15	–20	–30	–35	–45	–50	–60	–65	–75	–80	–90	–95	–105	–110	–120	–125	–135
30	10	5	0	–10	–20	–25	–30	–40	–50	–55	–65	–70	–80	–85	–95	–100	–110	–115	–125	–130	–140
35	10	5	–5	–10	–20	–30	–35	–40	–50	–60	–65	–75	–80	–90	–100	–105	–115	–120	–130	–135	–145
40	10	0	–5	–15	–20	–30	–35	–45	–55	–60	–70	–75	–85	–95	–100	–110	–115	–125	–130	–140	–150
WINDS ABOVE 40 HAVE LITTLE ADDITIONAL EFFECT.	LITTLE DANGER					INCREASING DANGER (Flesh may freeze within 1 min.)				GREAT DANGER (Flesh may freeze within 30 seconds)											

DANGER OF FREEZING EXPOSED FLESH FOR PROPERLY CLOTHED PERSONS

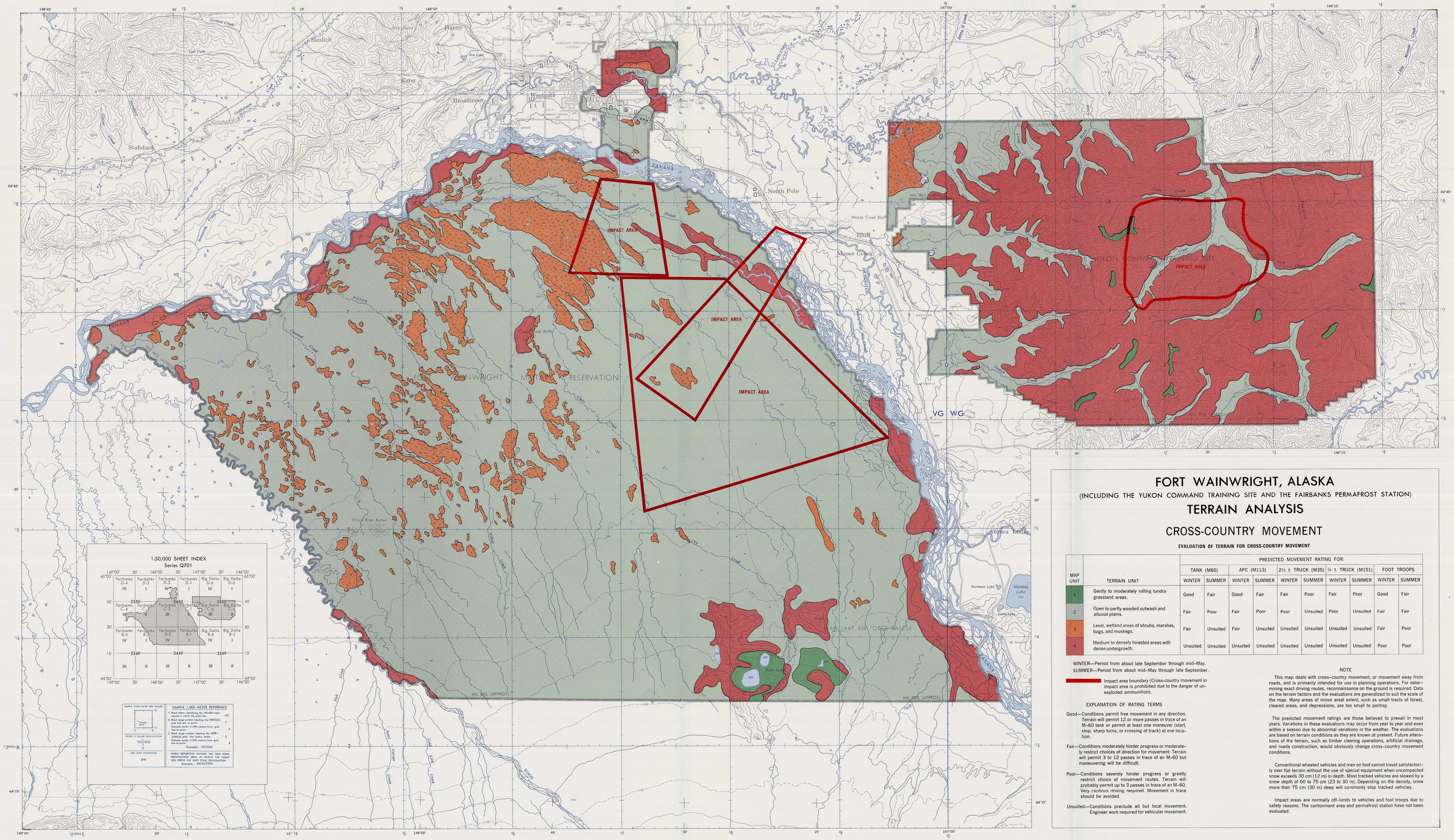
I. CROSS-COUNTRY MOVEMENT

Cross-country movement is defined as the off-road movement of military vehicles and personnel. The principal terrain characteristics which affect movement are soil type, state of ground (wet, moist, dry, frozen), slope, vegetation, surface roughness, and drainage features.

Most of the study area evaluated is generally not suited for cross-country movement during summer due to wet, soft soils in the lowland areas of Fort Wainwright and because of the forested areas and steeper slopes of the upland areas within the Yukon Command Training Site. Movement conditions are somewhat improved in winter when the low, poorly drained areas are frozen, but movement within the forested areas becomes more difficult because of deep snow. For the purposes of this evaluation, winter is defined as the period from about late September through mid-May, and summer, the period from about mid-May through late September.

Evaluations of movement conditions apply primarily to tracked vehicles (M60 Tank and M113 APC), wheeled vehicles not equipped with any traction aids (M151 1/4t Truck and M35 2 1/2t Truck), and foot troops. Suitability for winter foot troop movement is based on the use of snowshoes and skis.

MAP UNIT	GENERALIZED TERRAIN CONDITIONS	MOVEMENT OF TRACKED VEHICLES	MOVEMENT OF WHEELED VEHICLES	MOVEMENT OF FOOT TROOPS
1	Gently to moderately rolling tundra grassland areas intermixed with low shrubs and widely scattered trees. Chiefly located in the Blair Lakes areas of the reservation and along ridges in upland areas of the Yukon Command Training Site. Slopes mainly between 0 and 8%, occassionally reaching 15% in the upland areas. Soils mainly silts; soft where wet, commonly where permafrost occurs. Otherwise, ground chiefly firm when frozen or dry.	Movement generally unrestricted during winter months when ground frozen. Slowed in summer due to wet soils over areas of discontinuous permafrost.	Maneuverability moderately hindered when ground frozen. Snow cover will further reduce movement. Summer movement feasible but severely restricted by wet soils and grasses.	Movement mostly unrestricted during winter. Somewhat slowed due to soft ground conditions during summer. Deep snow in winter will cause movement to be laborious.
2	Open to partly wooded outwash and alluvial plains. Vegetation includes extensive areas of scrub or brush and smaller areas of grassland openings. Most slopes between 0 and 10%. Locally, some short slopes approach 45%. Soils chiefly silty. Wet soil conditions prevail over large areas during summer.	Winter movement moderately slowed by randomly spaced trees; maneuvering required to avoid the larger trees. Deep snow will further restrict movement. Wet soils make summer movement extremely difficult; somewhat easier where terrain is relatively steep and soils are consequently better drained and drier.	Extremely difficult in winter due to the combined effects of moderate slopes, irregular surfaces, and randomly spaced trees. Any appreciable amount of snow cover will stop movement. Map unit area unsuited for wheeled vehicles during summer due to the adverse effects of soft, saturated soils, trees, surface roughness, and slopes.	Moderately slowed both winter and summer by vegetation. Deep snow will further slow movement.
3	Level, wetland areas of shrubs, marshes, bogs, and muskegs. Soils mainly very poorly drained peats; some silts. Commonly saturated or water-covered in summer; frozen and solid in winter.	Movement fairly easy when wetland areas frozen; however, randomly scattered trees must be avoided in muskeg areas. Deep snow will severely restrict movement. Area unsuited during summer due to very soft, wet soils.	Severely slowed in winter by hummocks and shrub vegetation which make surface extremely irregular. Moderate snow cover helps smooth surface roughness; deep snow renders area untrafficable. Movement precluded during summer when wet conditions prevail.	Fairly easy in winter except when snow loose and deep. Severely restricted by extremely wet ground conditions in summer.
4	Medium to densely forested areas with dense undergrowth. Most slopes range between 25 and 45% in the upland areas of northern Fort Wainwright and the Yukon Command Training Site. Elsewhere, chiefly along the Tanana and Wood River terraces, slopes range between 0 and 10%.	Movement precluded at all times due to closely spaced trees and moderate to steep slopes.	Map unit area unsuited at all times. Dense vegetation and moderate to steep slopes preclude movement.	Severely slowed during both winter and summer. Closely spaced trees and forest undergrowth chief impediments to movement. Deep winter snows an additional impairment to movement.



FORT WAINWRIGHT, ALASKA

(INCLUDING THE YUKON COMMAND TRAINING SITE AND THE FAIRBANKS PERMAFROST STATION)

TERRAIN ANALYSIS

CROSS-COUNTRY MOVEMENT

EVALUATION OF TERRAIN FOR CROSS-COUNTRY MOVEMENT

MAP UNIT	TERRAIN UNIT	PREDICTED MOVEMENT RATING FOR: TANK (M60)		APC (M113)		2½ t. TRUCK (M35)		¼ t. TRUCK (M151)		FOOT TROOPS	
		WINTER	SUMMER	WINTER	SUMMER	WINTER	SUMMER	WINTER	SUMMER	WINTER	SUMMER
1	Gently to moderately rolling tundra grassland areas.	Good	Fair	Good	Fair	Fair	Poor	Fair	Poor	Good	Fair
2	Open to partly wooded outwash and alluvial plains.	Fair	Poor	Fair	Poor	Poor	Unsuited	Poor	Unsuited	Fair	Fair
3	Level, wetland areas of shrubs, marshes, bogs, and muskegs.	Fair	Unsuited	Fair	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited	Fair	Poor
4	Medium to densely forested areas with dense undergrowth.	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited	Poor	Poor

WINTER—Period from about late September through mid-May.
SUMMER—Period from about mid-May through late September.

Impact area boundary (Cross-country movement in impact area is prohibited due to the danger of unexploded ammunition).

EXPLANATION OF RATING TERMS

Good—Conditions permit free movement in any direction. Terrain will permit 12 or more passes in trace of an M-60 tank or permit at least one maneuver (start, stop, sharp turns, or crossing of track) at one location.

Fair—Conditions moderately hinder progress or moderately restrict choices of direction for movement. Terrain will permit 3 to 12 passes in trace of an M-60 but maneuvering will be difficult.

Poor—Conditions severely hinder progress or greatly restrict choice of movement routes. Terrain will probably permit up to 3 passes in trace of an M-60. Very cautious driving required. Movement in trace should be avoided.

Unsuited—Conditions preclude all but local movement. Engineer work required for vehicular movement.

NOTE

This map deals with cross-country movement, or movement away from roads, and is primarily intended for use in planning operations. For determining exact driving routes, reconnaissance on the ground is required. Data on the terrain factors and the evaluations are generalized to suit the scale of the map. Many areas of minor areal extent, such as small tracts of forest, cleared areas, and depressions, are too small to portray.

The predicted movement ratings are those believed to prevail in most years. Variations in these evaluations may occur from year to year and even within a season due to abnormal variations in the weather. The evaluations are based on terrain conditions as they are known at present. Future alterations of the terrain, such as timber clearing operations, artificial drainage, and roads construction, would obviously change cross-country movement conditions.

Conventional wheeled vehicles and men on foot cannot travel satisfactorily over flat terrain without the use of special equipment when uncompacted snow exceeds 30 cm (12 in) in depth. Most tracked vehicles are slowed by a snow depth of 60 to 75 cm (23 to 30 in). Depending on the density, snow more than 75 cm (30 in) deep will commonly stop tracked vehicles.

Impact areas are normally off-limits to vehicles and foot troops due to safety reasons. The cantonment area and permafrost station have not been evaluated.

Prepared by the Defense Mapping Agency Hydrographic/Topographic Center, Washington, D.C. for the Terrain Analysis Center, U.S. Army Engineer Topographic Laboratories, Fort Belvoir, Virginia. September 1978.

J. LINES OF COMMUNICATION

Lines of Communication (LOC) at Fort Wainwright are depicted on the accompanying map. Supportive information for LOC as shown on the graphic is provided in the tables following this summary. ROADS: The road network of Fort Wainwright consists of hard surface roads, and loose surface, improved and unimproved dirt roads and trails. The road system is generally adequate. Paved roads deteriorate rapidly when constructed on underlying permafrost and poorly drained soils. Some of the minor hard surface and dirt roads have been omitted from the graphic; the roads selected depict prevailing patterns and system connections. The length of the road system shown on the map is approximately 800 kilometers (497 miles), of which 36.4 kilometers (22.6 miles) are hard surface roads and 150 kilometers (93 miles) are improved dirt roads. In addition, an estimated total of 145 kilometers (90 miles) of unimproved dirt roads and 423 kilometers (263 miles) of trails occur in the study area. ROAD BRIDGES: There are three bridges on Fort Wainwright, all of which cross the Chena River. RAILROADS: All tracks on Fort Wainwright are federally owned and extend into the coal storage and industrial sites in the southern portion of the Fort Wainwright Cantoment Area. Total length is approximately 14.3 kilometers (8.9 miles) with a volume of traffic ranging from5 to 300 cars per month. AIRFIELDS/AIRSTRIPS: Wainwright Army Airfield is the only airfield on the reservation; it is between the north and south cantonment areas and services both fixed and rotary-wing aircraft. In addition, there are two airstrips on Fort Wainwright, Clear Creek and Blair Lakes Airstrips. Clear Creek is the only operational airstrip on the reservation. PIPELINES: The Trans-Alaska Oil Pipeline on the Yukon Command Training Site carries crude oil. All segments are depicted on the LOC map. HELICOPTER LANDING ZONES (HLZs): In addition to the airfield and the two airstrips, which are used for helicopter landings, there are nine designated helicopter landing zones. All 11 HLZs are used for training. DROP ZONES (DZs) Husky and Manchu are the only drop zones on Fort Wainwright. Husky Drop Zone is active during the summer months, while Manchu Drop Zone is active only during the winter months.

1. ROADS

ROUTE NUMBER/ NAME	ROUTE GRID REFERENCE FROM	TO	LENGTH OF SEGMENT	MILITARY LOAD CLASSIFICATION	ROUTE TYPE	SURFACE CONSTRUCTION MATERIAL	SURFACE WIDTH/ CONDITION	SHOULDERS CONSTRUCTION MATERIAL	SHOULDERS WIDTH/ CONDITION	REMARKS
Alder Avenue	VG675890	VG704885	2.8 km (1.7 mi)	No Data	Fair-weather	Gravel	10.4 m (34 ft)/ Excellent	No shoulders exist		
Apple Street	VG708908	VG716910	1.1 km (0.7 mi)	No data	All-weather	Asphaltic Concrete	6.7 m (22 ft)/ Good	Gravel	0.9 m (3 ft)/ Fair	
							8.5 m (28 ft)/ Good	Gravel	0.9 m (3 ft)/ Fair	
Segment 1	VG708908	VG713911	0.6 km (0.4 mi)	No Data	All-weather	Asphaltic Concrete	6.7 m (22 ft)/ Good	Gravel	0.9 m (3 ft)/ Fair	
Segment 2	VG713911	VG716910	0.5 km (0.3 mi)	No Data	All-weather	Asphaltic Concrete	8.5 m (28 ft)/ Good	Gravel	0.9 m (3 ft)/ Fair	
Applegate Drive	VG675904	VG680897	1.0 km (0.6 mi)	No Data	Fair-weather	Gravel	5.5 m (18 ft)/ Good	No shoulders exist		
Badger Road	VG732885	VG742894	1.6 km (1.0 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Excellent	Gravel	1.5 m (5 ft)/ Good	
Birch Hill Loop Road	VG708928	VG728925	4.0 km (2.5 mi)	No Data	Fair-weather	Dirt	4.3 m (14 ft)	No shoulders exist		
						Gravel	5.2 m (17 ft)/ Good	No shoulders exist		
Segment 1	VG708928	VG730932	2.1 km (1.3 mi)	No Data	Fair-weather	Dirt	4.3 m (14 ft)/ Good	No shoulders exist		Road will become slippery and miry during spring.
Segment 2	VG730932	VG728925	1.9 km (1.2 mi)	No Data	Fair-weather	Gravel	5.2 m (17 ft)/ Good	No shoulders exist		
Birch Hill Road	VG708928	VG733920	3.1 km (1.9 mi)	No Data	Fair-weather	Gravel	5.2 m (17 ft)/ Good	No shoulders exist		
Bonnifield Trail	VG599615	VG665838	27 km (16.8 mi)	No Data	Trail	Dirt	3.1 m (10 ft)/ Poor	No shoulders exist		Because of muskeg and bogs, trail can only be passable under winter conditions.
Brigadier Road	WG170674	WG385636	41 km (25.5 mi)	No Data	Fair-weather	Dirt	3.7 m (12 ft) Poor	No shoulders exist		Road will become slippery and miry during the spring.
Canol Service Road	VG684926	VG692912	1.6 km (1.0 mi)	No Data	Fair-weather	Gravel	6.1 m (20 ft)/ Excellent	No shoulders exist		
Cedar Street	VG675890	VG681890	0.6 km (0.4 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Fair	No shoulders exist		
Chippewa Avenue	VG703881	VG707881	0.5 km (0.3 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	No shoulders exist		
Dogwood Street	VG713914	VG716914	0.3 km (0.2 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	No shoulders exist		
East Ammo Road	VG735937	VG733920	2.8 km (1.7 mi)	No Data	Fair-weather	Dirt	5.5 m (18 ft) 6.1 m (20 ft)/ Good	No shoulders exist		
Segment 1	VG735937	VG746924	1.3 km (0.8 mi)	No Data	Fair-weather	Dirt	5.5 m (18 ft)/ Good	No shoulders exist		Road will become slippery and miry during the spring.
Segment 2	VG746924	VG733920	1.5 km (0.9 mi)	No Data	Fair-weather					
Eighth Street	VG678886	VG678894	0.6 km (0.4 mi)	No data	All-weather	Dirt	6.1 m (20 ft)/ Good	No shoulders exist		Road will become slippery and miry during the spring.
Farmers Loop Road	VG679940	VG682950	1.1 km (0.7 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Fair	No shoulders exist		
Fegre Road	VG691902	VG691910	1.0 km (0.6 mi)	No Data	Fair-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	Gravel	0.6 m (2 ft)/ Fair	
Gaffney Road	VG668901	VG720908	6.3 km (3.9 mi)	No Data	All-weather	Dirt	3.7 m (12 ft)/ Fair	No shoulders exist		Road will become slippery and miry. during the spring
						Asphaltic Concrete	13.4 m (44 ft)/ Excellent	Gravel	1.8 m (6 ft)/ Good	
Segment 1	VG666901	VG708908	5.2 km (3.2 mi)	No Data	All-weather		11.0 m (36 ft) 7.3 m (24 ft)/ Excellent	No shoulders exist Gravel	1.2 m (4 ft)/ Fair	
Segment 2	VG708908	VG716908	0.6 km (0.4 mi)	No Data	All-weather	Asphaltic Concrete	13.4 m (44 ft)/ Excellent	Gravel	1.8 m (6 ft)/ Good	
Segment 3	VG716908	VG720908	0.5 km (0.3 mi)	No Data	All-weather	Asphaltic Concrete	11.0 m (36 ft)/ Excellent	No shoulders exist		
Glass Drive	VG671899	VG675904	0.8 km (0.5 mi)	No Data	Fair-weather	Asphaltic Concrete	7.3 m (24 ft)/ Excellent	Gravel	1.2 m (4 ft)/ Good	
Ile De France Avenue	VG704885	VG707885	0.8 km (0.5 mi)	No Data	All-weather	Gravel	5.5 m (18 ft)/ Good	No shoulders exist		
Johnson Road	WG116599	WG170674	12.1 km (7.5 mi)	No Data	Fair-weather	Asphaltic Concrete	9.1 m (30 ft)/ Good	Gravel	1.5 m (5 ft)/ Fair	
						Gravel	7.3 m (24 ft)/ Good	No shoulders exist		
Segment 1	WG116599	WG134624	4 km (2.5 mi)	No Data	Fair-weather	Dirt	3.7 m (12 ft) Poor	No shoulders exist		
Segment 2	WG134624	WG170674	8 km (5.0 mi)	No Data	Fair-weather	Gravel	7.3 m (24 ft)/ Good	No shoulders exist		
Kenney Road	VG723894	VG723893	1.1 km (0.7 mi)	No Data	Fair-weather	Dirt	3.7 m (12 ft)/ Poor	No shoulders exist		Road will become slippery and miry during the spring.
					Fair-weather	Dirt	3.7 m (12 ft)/ Fair	No shoulders exist		
					All-weather	Gravel	3.7 m (12 ft)/ Fair	No shoulders exist		
Segment 1	VG723899	VG727898	0.3 km (0.2 mi)	No Data	All-weather	Asphaltic Concrete	6.1 m (20 ft)/ Good	Gravel	1.2 m (4 ft)/ Good	
Segment 2	VG727898	VG730894	0.5 km (0.3 mi)	No Data	Fair-weather	Asphaltic Concrete	6.1 m (20 ft)/ Good	Gravel	1.2 m (4 ft)/ Fair	
Segment 3	VG730894	VG727891	0.3 km (0.2 mi)	No Data	Fair-weather	Dirt	3.7 m (12 ft)/ Fair	No Data	No Data	Road will become slippery and miry during the spring.
Ketcham Road	VG724905	VG723896	1.3 km (0.8 mi)	No Data	All-weather	Gravel	3.7 m (12 ft)/ Fair	No Data	No Data	
Luzon Avenue	VG707881	VG711895	1.6 km (1.0 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Excellent	Gravel	1.2 m (4 ft)/ Good	
					Fair-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	Gravel	1.5 m (5 ft)/ Good	
Segment 1	VG707881	VG707890	1.0 km (0.6 mi)	No Data	All-weather	Gravel	4.9 m (16 ft)/ Good	No shoulders exist		
Segment 2	VG707890	VG711895	0.6 km (0.4 mi)	No Data	Fair-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	Gravel	1.5 m (5 ft)/ Good	
						Gravel	4.9 m (16 ft)/ Good	No shoulders exist		

J. LINES OF COMMUNICATION (Continued)

1. ROADS (Continued)

ROUTE NUMBER/ NAME	ROUTE GRID REFERENCE FROM	TO	LENGTH OF SEGMENT	MILITARY LOAD CLASSIFICATION	ROUTE TYPE	SURFACE CONSTRUCTION MATERIAL	SURFACE WIDTH/ CONDITION	SHOULDERS CONSTRUCTION MATERIAL	SHOULDERS WIDTH/ CONDITION	REMARKS
Manchu Road	VG983745	WG170674	25 km (15.5 mi)	No Data	Fair-weather	Gravel	7.3 m (24 ft)/ Good	No shoulders exist		
						Dirt	3.7 m (12 ft)/ Poor	No shoulders exist		
Segment 1	VG983745	WG127707	18 km (11.2 mi)	No Data	Fair-weather	Gravel	7.3 m (24 ft)/ Good	No shoulders exist		
Segment 2	WG127707	WG170674	7 km (4.3 mi)	No Data	Fair-weather	Dirt	3.7 m (12 ft) Poor	No shoulders exist		Road will become slippery and miry during the spring.
Meridan Road	VG696886	VG694901	1.6 km (1.0 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Excellent	Gravel	1.2 m (4 ft)/ Fair	
				No Data	Fair-weather	Gravel	9.1 m (30 ft)/ Good	No shoulders exist		
Segment 1	VG696892	VG694901	1.1 km (0.7 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Excellent	Gravel	1.2 m (4 ft)/ Good	
Segment 2	VG696886	VG696892	0.5 km (0.3 mi)	No Data	Fair-weather	Gravel	9.1 m (30 ft) Good	No shoulders exist		
Montgomery Road	VG696895	VG733887	2.7 km (1.7 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft) Excellent	Gravel	1.5 m (5 ft) Good	
Neely Road	VG672894	VG703894	3.4 km (2.1 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	No shoulders exist		
						Asphaltic Concrete	7.3 m (24 ft)/ Good	Gravel	1.2 m (4 ft)/ Fair	
Segment 1	VG672894	VG692894	2.1 km (1.3 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	No shoulders exist		
Segment 2	VG692894	VG703894	1.3 km (0.8 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	Gravel	1.2 m (4 ft)/ Fair	
Ninth Street	VG681887	VG684898	1.1 km (0.7 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	No shoulders exist		
Segment 1	VG681887	VG683895	0.8 km (0.5 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	No shoulders exist		
Segment 2	VG683895	VG684898	0.3 km (0.2 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	Gravel	1.5 m (5 ft)/ Good	
North Beaver Creek Road	VG993832	WG135782	9 km (5.6 mi)	No Data	Fair-weather	Dirt	3.7 m (12 ft)/ Poor	No shoulders exist		Road will become slippery and miry during the spring.
Oak Avenue	VG696892	VG703892	0.7 km (0.4 mi)	No Data	Fair-weather	Gravel	6 7 m (22 ft)/ Good	No shoulders exist		
Old Badger Road	VG707881	VG727891	1.6 km (1.0 mi)	No Data	Fair-weather	Gravel	10.4 m (34 ft)/ Good	No shoulders exist		
							9.8 m (32 ft)/ Fair	No shoulders exist		
Segment 1	VG707881	VG716881	0.9 km (0.6 mi)	No data	Fair-weather	Gravel	10.4 m (34 ft)/ Good	No shoulders exist		
Segment 2	VG716881	VG727891	0.7 km (0.4 mi)	No Data	Fair-weather	Gravel	9.8 m (32 ft)/ Fair	No shoulders exist		
Quarry Road	WG029705	WG068724	6.4 km (4.0 mi)	No Data	Fair-weather	Dirt	7.3 m (24 ft)/ Fair	No Data	No Data	Road will become slippery and miry during the spring.
Rhineland Avenue	VG704887	VG707887	0.5 km (0.3 mi)	No Data	All-weather	Asphaltic Concrete	9.1 m (30 ft)/ Good	Gravel	1.5 m (5 ft)/ Fair	
Richardson Highway	VG687883	VG729868	5.0 km (3.1 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ & 7.3 m (24 ft)/ Excellent	Asphaltic Concrete	1.8 m (6 ft)/ Good	4 Lanes, divided
River Road	VG691902	VG727898	6.6 km (4.1 mi)	No Data	Fair-weather	Gravel	11.0 m (36 ft)/ 8.2 m (27 ft)/ Good	No Data	No Data	
Segment 1	VG691902	VG692912	1.3 km (0.8 mi)	No Data	Fair-weather	Gravel	11.0 m (36 ft)/ Good	No Data	No Data	
Segment 2	VG692912	VG727898	5.3 km (3.3 mi)	No Data	Fair-weather	Gravel	8.2 m (27 ft)/ Good	No Data	No Data	
Sage Hill Road	VG726914	VG744930	2.4 km (1.5 mi)	No Data	Fair-weather	Dirt	3.7 m (12 ft)/ 5.5 m (18 ft)/ Fair	No Data	No Data	
Segment 1	VG736923	VG744930	1.3 km (0.8 mi)	No Data	Fair-weather	Dirt	3.7 m (12 ft)/ Fair	No Data	No Data	Road will become slippery and miry during the spring.
Segment 2	VG726914	VG733920	1.1 km (0.7 mi)	No Data	Fair-weather	Dirt	5.5 m (18 ft)/ Fair	No Data	No Data	Road will become slippery and miry during the spring.
Santigo Avenue	VG702885	VG703895	1.2 km (0.7 mi)	No Data	All-weather	Asphaltic Concrete	8.5 m (28 ft)/ 9.1 m (30 ft)/ Good	No shoulders exist Gravel	1.2 m (4 ft)/ Good	
Segment 1	VG704887	VG703895	1.0 km (0.6 mi)	No Data	All-weather	Asphaltic Concrete	8.5 m (28 ft)/ Good	No shoulders exist		
Segment 2	VG702883	VG703885	0.2 km (0.1 mi)	No Data	All-weather	Asphaltic Concrete	9.1 m (30 ft)/ Good	Gravel	1.2 m (4 ft)/ Good	
Sixth Avenue	VG675890	VG675894	0.3 km (0.2 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Fair	No shoulders exist		
Ski Road	VG708928	VG710920	0.8 km (0.5 mi)	No Data	Fair-weather	Gravel	5.5 m (18 ft)/ Good	No Data	No Data	
Skyline Drive	WG135782	WG236837	29 km (18.0 mi)	No Data	Fair-weather	Dirt	3.7 m (12 ft)/ Poor	No Data	No Data	Road will become slippery and miry during the spring.
Skyview Road	VG696933	VG725935	3.1 km (1.9 mi)	No Data	Fair-weather	Dirt	4.6 m (15 ft)/ Good	No Data	No Data	Road will become slippery and miry during the spring.
South Beaver Creek Road	WG156768	WG217778	6.9 km (4.3 mi)	No Data	Fair-weather	Dirt	3.7 m (12 ft)/ Poor	No shoulders exist		Road will become slippery and miry during the spring.
South Gate Road	VG703879	VG696889	1.5 km (0.9 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	Gravel	1.2 m (4 ft)/ Good	
					Fair-weather	Gravel	10.4 m (34 ft)/ Good	No shoulders exist		
Segment 1	VG703879	VG702883	0.5 km (0.3 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	Gravel	1.2 m (4 ft)/ Good	
Segment 2	VG702883	VG696889	1.0 km (0.6 mi)	No Data	Fair-weather	Gravel	10.4 m (34 ft)/ Good	No shoulders exist		
Tamarack Drive	VG674897	VG680898	0.6 km (0.4 mi)	No Data	All-weather	Asphaltic Concrete	8.2 m (27 ft)/ Good	No shoulders exist		
Tenth Street	VG688894	VG688898	0.5 km (0.3 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	Gravel	1.8 m (6 ft)/ Good	
Trail "B" Road	VG734928	VG730925	1.8 km (1.1 mi)	No Data	Fair-weather	Dirt	3.7 m (12 ft)/ Fair	No Data	No Data	Road will become slippery and miry during the spring.
Trainer Gate Road	VG684913	VG703907	2.3 km (1.4 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	Gravel	1.2 m (4 ft)/ Fair	
					Fair-weather	Gravel	9.1 m (30 ft)/ Good	No Data	No Data	
Segment 1	VG684913	VG691910	1.0 km (0.6 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	Gravel	1.2 m (4 ft)/ Fair	
Segment 2	VG691910	VG696910	0.3 km (0.2 mi)	No Data	Fair-weather	Gravel	9.1 m (30 ft)/ Good	No shoulders exist		
Segment 3	VG696910	VG703907	1.0 km (0.6 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Good	Gravel	1.2 m (4 ft)/ Fair	
100th Street	VG713911	VG713914	0.2 km (0.1 mi)	No Data	All-weather	Asphaltic Concrete	8.5 m (28 ft)/ Excellent	No shoulders exist		
103rd Street	VG716914	VG716908	0.3 km (0.2 mi)	No Data	All-weather	Asphaltic Concrete	8.5 m (28 ft)/ Excellent	No shoulders exist		
599th Street	VG672894	VG671899	0.5 km (0.3 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Excellent	No shoulders exist		
600th Street	VG675894	VG674897	0.8 km (0.5 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Excellent	No shoulders exist		

J. LINES OF COMMUNICATION (Continued)

1. ROADS (Continued)

ROUTE NUMBER/ NAME	ROUTE GRID REFERENCE FROM	TO	LENGTH OF SEGMENT	MILITARY LOAD CLASSIFICATION	ROUTE TYPE	SURFACE CONSTRUCTION MATERIAL	SURFACE WIDTH/ CONDITION	SHOULDERS CONSTRUCTION MATERIAL	SHOULDERS WIDTH/ CONDITION	REMARKS
601st Street	VG678894	VG678897	0.5 km (0.3 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Excellent	No shoulders exist		
602nd Street	VG680894	VG680897	0.5 km (0.3 mi)	No Data	All-weather	Asphaltic Concrete	7.3 m (24 ft)/ Excellent	No shoulders exist		
Additional Installation "ROADS" (unnamed)										
Improved Dirt Roads			28 km (17 mi)	No Data	Fair-weather	Dirt	4.3 to 9.1 m (14 to 30 ft)/ Poor to Fair	No shoulders exist		Roads will become slippery and miry during the spring.
Unimproved Dirt Roads			145 km (90 mi)	No Data	Fair-weather	Dirt	3.4 to 7.3 m (11 to 24 ft)/ Poor to Fair	No shoulders exist		Roads will become slippery and miry during the spring.
Trails			396 km (246 mi)	No Data	Trail	Dirt	3.1 to 4.9 m (10 to 16 ft)/ Poor	No shoulders exist		Because of muskeg and bogs, trails can only be passable under winter conditions.

ROAD BRIDGES

BRIDGE NUMBER	ROUTE DESIGNATION	GRID REFERENCE	FEATURE CROSSED	MILITARY LOAD CLASSIFICATION	DIMENSIONS LENGTH/OVERALL WIDTH/ ROADWAY WIDTH	CLEARANCE	TYPE/CONSTRUCTION MATERIAL	CONDITION	REMARKS
1	River Road	VG693903	Chena River	10 tons 2 lanes	89.6 m (294 ft) long/ overall width 6.9 m (22 ft 7 in)/ roadway width 6.7 m (22 ft).	Unlimited vertical; underbridge 4 m (13 ft)	Deck; steel beam girder/ wooden deck.	Good	Government owned, built in 1953. Engineer's bridge
2	Trainer Gate Road	VG695910	Chena River	50 tons 1 lane	195.7 m (642 ft) long/overall width 6.2 m (20 ft 6 in)/ roadway width 3.8 m (12 ft 6 in).	Unlimited vertical; underbridge 7.6 m (25 ft)	Deck; through-type steel trusses/wooden deck.	Good	Property of Alaska, built in 1944. Combination road and railroad bridge.
3	River Road	VG728899	Chena River	50 tons 1 lane	79.2 m (260 ft) long/overall width 5.0 m (16ft 6 in)/ roadway width 3.5 m (11 ft 6 in).	Unlimited vertical; underbridge 5.8 m (19 ft)	Steel prefab M1 double truss, double story bailey/wooden deck.	Fair	Government owned, built in 1949.

2. RAILROADS

MAP NUMBER	GRID COORDINATES FROM	TO	LENGTH OF TRACK OR TRACK SEGMENT	OWNERSHIP AND CONDITION	TRACK AND BED CHARACTERISTICS	SIDINGS LENGTH AND GRID COORDINATES FROM TO	BALLAST MATERIAL	TRAFFIC VOLUME AND CAPACITY
Line 1	VG684913 – VG730876		9.1 km (5.7 mi)	U.S. Government owned; fair	Single track standard gage 1.44 m (4 ft 8.5 in) weight of rails 52 kg (115 lb); siding weight of rails 34 kg (75 lb).		Crushed stone	300 or more per month
						Siding 1: 2700 m (8858 ft); VG682869 – VG697882	Crushed stone	5 to 24 cars per month
						Siding 2: 549 m (1800 ft); VG682878 – VG684876	Crushed stone	5 to 24 cars per month
						Siding 3: 671 m (2200 ft); VG690892 – VG695891	Crushed stone	300 or more per month
						Siding 4: 366 m (1200 ft); VG690894 – VG693894	Crushed stone	5 to 24 cars per month
						Siding 5: 732 m (2400 ft); VG694900 – VG698895	Crushed stone	5 to 24 cars per month

RAILROAD BRIDGES

MAP NUMBER	GRID REFERENCE	FEATURE CROSSED	NUMBER OF TRACKS	ROADWAY WIDTH	CLEARANCE HORIZONTAL	CLEARANCE VERTICAL	DECK MATERIAL	OVERALL LENGTH	TYPE OF STRUCTURE	REMARKS
1	VG695910	Chena River	Single	3.8 m (12 ft 6 in)	No Data	Unlimited	Wooden	195.7 m (642 ft)	Deck; through-type steel trusses	Property of Alaska RR Railroad, built in 1944. Combination road and railroad bridge.

3. AIRFIELDS/AIRSTRIPS

MAP NUMBER; NAME LOCATION; TYPE; AND CLASSIFICATION

Map Number: 1

Name: Wainwright Army Airfield

Grid Reference: VG710902

Type: Army
Classification: Airfield

ELEVATION AND STATUS

Elevation: 136.6 m (448 ft)

Status: Operational

RUNWAY DESCRIPTION

Runway: North runway 2790 m (9155 ft), 46.9 m (154 ft). South runway 2377 m (7800 ft), 46.9 m (154 ft).

Azimuth: 089°–269°

Weight Bearing Capacity: Single-wheel, AUW 24; Twin-wheel, AUW 32.

Surface Material and Condition: Asphaltic concrete surface in fair to good condition.

TAXIWAY, PARKING, APRON, AND HARDSTAND AREAS DESCRIPTION

Taxiways:
1372 x 24.4 m (4500 x 80 ft)
488 x 24.4 m (1600 x 80 ft)
671 x 24.4 m (2200 x 80 ft)
671 x 24.4 m (2200 x 80 ft)
335 x 24.4 m (1100 x 80 ft)
792 x 24.4 m (2600 x 80 ft)
244 x 24.4 m (800 x 80 ft)

Maximum weight bearing capacity same as longest runway, asphaltic concrete surface, in fair condition.

Aprons: Hangar access apron 26,261 m^2 (282,683 ft^2); special purpose apron 3661 m^2 (39,414 ft^2); fixed wing aircraft parking aprons 18,360 m^2 (197,635 ft^2); rotary wing aircraft parking aprons 8453 m^2 (90,994 ft^2).

BUILDING DESCRIPTION

Hangars:
Hangar No #1 (Bldg #P-1557) 61 x 99 m (200 x 324 ft); floor space, 10,412 m^2 (112,080 ft^2); concrete, corrugated metal.

Hangar No #2 (Bldg #S-3008) 46 x 61 m (150 x 200 ft); floor space, 4664 m^2 (50,200 ft^2); concrete, frame.

Hangar No #3 (Bldg #S-3005) 46 x 61 m (150 x 200 ft); floor space, 4673 m^2 (50,300 ft^2); concrete, frame.

Hangar No #4 & 5 (Bldg #P-2106) 144 x 45 m (472 x 148 ft); floor space, 6475 m^2 (69,700 ft^2); concrete, masonry.

Hangar No #6 (Bldg #P-2085) 46 x 61 m (150 x 200 ft); floor space 4664 m^2 (50,200 ft^2); concrete, wood frame.

Hangar No #7 & 8 (Bldg #P-2077) 144 x 45 m (472 x 148 ft); floor space 6475 m^2 (69,700 ft^2); concrete, masonry.

Administration Building:
Airfield Operations (Bldg #P-1563) 13 x 10 m (42 x 32 ft); floor space 137 m^2 (1472 ft^2); concrete, masonry.

Service Buildings:
Fire Station (Bldg #S-1578) 10 x 43 m (32 x 142 ft); floor space 661 m^2 (7120 ft^2); concrete, wood frame.

Fire Station (Bldg #P-3677) 30 x 20 m (99 x 66 ft); floor space 832 m^2 (8955 ft^2); concrete.

POL FACILITIES

Fuel: JP4 stored in two trucks. Dispensing facilities consist of one 9084 liters (2400 gal) tanker and one 4252 liters (1200 gal) tanker.

Capacities: 17 underground fuel tanks with fuel capacity 2,838,750 liters (750,000 gal).

NAVIGATIONAL AIDS

Control tower height 21.3 m (70 ft); rotating flashing beacon; high intensity runway lights; high intensity approach lights; sequenced flashing lights; runway and identifier lights (REIL) (Threshold Strobe lights); low-altitude instrument approaches, a VOR and non-directional radio beacon.

REMARKS

Military aviation fuels are the only fuel used. Heliport located at airfield.

The Bureau of Land Management aircraft are deployed from the field for fire fighting activities during summer months.

Fort Wainwright Army Airfield has maximum daily operation involving 142 fixed-wing aircraft and 329 rotary wing aircraft.

J. LINES OF COMMUNICATION (Continued)

3. AIRFIELDS/AIRSTRIPS (Continued)

MAP NUMBER; NAME LOCATION; TYPE; AND CLASSIFICATION	ELEVATION AND STATUS	RUNWAY DESCRIPTION	TAXIWAY; PARKING APRON; AND HARDSTAND AREA DESCRIPTION	BUILDING DESCRIPTION	POL FACILITIES	NAVIGATIONAL AIDS	REMARKS
Map Number: 2 Name: Clear Creek Airstrip Location: VG730475 Type: Army Classification: Airstrip	Elevation: 201 m (660 ft) Status: Operational	Runway: 1524 m long; 49 m wide (5000 ft long; 160 ft wide). Azimuth: 150°–330° Surface Material and Condition: Dirt, in fair condition.	None	None	None	None	
Map Number: 3 Name: Blair Lakes Airstrip Location: VG826876 Type: Army Classification: Airstrip	Elevation: 256 m (840 ft) Status: Non-operational	Runway: 366 m long; 15 m wide (1200 ft long; 50 ft wide). Azimuth: 160°–340° Surface Material and Condition: Dirt, in poor condition.	None	None	None	None	

NOTE: Runway weight bearing capacity in pounds (gross weight of aircraft) is determined by adding 000 to figure following AUW. Runway weight bearing capacity given is for unlimited operations. Aircraft weights higher than given require prior permission from the aerodrome controlling authority.

AUW – All up weight. Maximum weight bearing capacity for any aircraft irrespective of landing gear.

5. PIPELINES

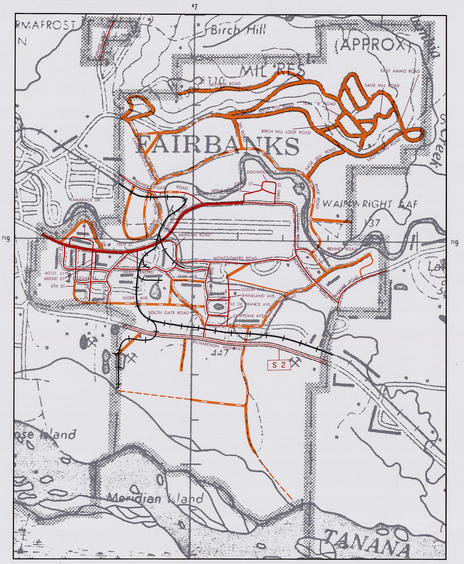
MAP NUMBER	GRID REFERENCE FROM	TO	STATUS	OWNERSHIP	PIPELINE CHARACTERISTICS	TANK CROSSING SITES	REMARKS
1	WG013684	WG051631	Operative; supplies crude oil from Prudhoe Bay to Valdez.	Owned and built by Alyeska Pipeline Service Company.	Steel 122 cm (48 in) diameter; elevated pipe, less than 2.4 m (8 ft) in height	None	Trans-Alaska pipeline
2	VG951757	VG955754	Operative; supplies crude oil from Prudhoe Bay to Valdez.	Owned and built by Alyeska Pipeline Service Company.	Steel 122 cm (48 in) diameter; pipe is buried.	None	Trans-Alaska pipeline
3	VG683927	VG695910	Operative; supplies diesel fuel, motor gas, jet petroleum, and aviation gas.	U.S. Government; Haines pipeline.	Three 20.3 cm (8 in) diameter; four 7.6 cm (3 in) diameter; pipes are buried.	None	
4	VG683927	VG740916	Operative; aviation gas.	U.S. Government; Haines pipeline.	One 20.3 cm (8 in) diameter; pipe is buried.	None	
5	VG695910	VG723928	Operative; supplies diesel fuel and mogas.	U.S. Government; Haines pipeline.	Two 7.6 cm (3 in) diameter; pipes are buried.	None	

6. HELICOPTER LANDING ZONES

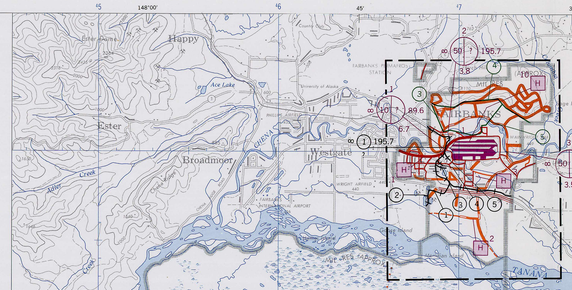
MAP NUMBER AND/OR NAME	GRID REFERENCE	DIMENSIONS	AZIMUTH	ELEVATION	SURFACE MATERIAL	RESTRAINTS	REMARKS
1 Bassett Army Hospital	VG684897	12.2 x 12.2 m (40 x 40 ft)	090° – 270°	137 m (448 ft)	Concrete	Power cables located to the east and west are marked with bright orange obstruction balls.	Pad is in the north yard of Basset Army Hospital. Pad has lighting which is suitable for night use.
2	VG709863	5.5 x 5.5 m (18 x 18 ft)	No Data	130 m (427 ft)	Concrete	Telephone lines 122 m (400 ft) east of pad.	Pad is located near firing ranges.
3	VG711886	305 x 76 m (1000 x 250 ft)	000° – 180°	137 m (448 ft)	Grass	Buildings 207 m (680 ft) northwest and southwest of pad.	Practice landing area.
4	VG617690	61 x 61 m (200 x 200 ft)	No Data	229 m (750 ft)	Dirt	Low trees to the north and west, open on south side of hill top..	Approach to the landing site is controlled by wind conditions. Fair condition.
5	VG610667	46 x 46 m (150 x 150 ft)	No Data	229 m (750 ft)	Dirt	Low trees to the north and east, open on west side of hill top.	Approach to the landing site is controlled by wind conditions. Fair condition.
6 Clear Creek Airstrip	VG728480	Runway: 1524 m long; 49 m wide (5000 ft long; 160 ft wide).	150° – 330°	201 m (660 ft)	Dirt	No obstructions.	Fair condition.
7 Blair Lakes Airstrip	VG826376	Runway: 366 m long; 15 m wide (1200 ft long; 50 ft wide).	160° – 340°	256 m (840 ft)	Dirt	No obstructions.	Poor condition.
8 Nike Site, "C" Battery	WG120618	46 x 46 m (150 x 150 ft)	No Data	610 m (2000 ft)	Gravel	Building 61 m (200 ft) southwest of pad.	Approach to the landing site is controlled by wind conditions. Poor condition.
9 Nike Site, "B" Battery	WG127707	29 x 29 m (94 x 94 ft)	No Data	594 m (1950 ft)	Gravel	Building 91 m (300 ft) north of pad.	Approach to the landing site is controlled by wind conditions. Poor condition.
10 Wainwright Army Airfield	VG707906	Runway: 2377 m long; 47 m wide (7800 ft long; 154 ft wide).	089° – 269°	137 m (448 ft)	Asphaltic concrete	There are various antennas located west of the non-instrument approach end of runway, highest antenna 68 m (222 ft).	Low hills north of the airfield with the highest elevation 208 m (682 ft)
11	VG666414	30 x 15 m (100 x 50 ft)	125° – 305°	223 m (730 ft)	Dirt	Building 168 m (550 ft) north of pad.	Located in the Blair Lakes Bombing/Gunnery Range.

7. DROP ZONES

MAP NUMBER AND NAME	GRID REFERENCE	DIMENSIONS	AZIMUTH	ELEVATION	SURFACE DESCRIPTION	AIRCRAFT OBSTRUCTION	REMARKS
1 Husky	NE 960 835 SE 970 818 SW 964 816 NW 953 832	1900 x 800 m (6233 x 2625 ft)	150° – 330°	174 m (570 ft)	Soft or organic soils, aquatic herbaceous type vegetation usually free of large trees.	None	Active in summer.
2 Manchu	NE 646 743 SE 668 720 SW 658 710 NW 636 734	3100 x 1400 m (10171 x 4593 ft)	135° – 315°	140 m (460 ft)	Soft or organic soils, aquatic herbaceous type vegetation usually free of large trees.	None	Active in winter only.



FAIRBANKS INSET - SCALE 1:50,000



1:50,000 SHEET INDEX
Series Q701

65°00'	148°00'	30'	147°00'	30'	146°00'	65°00'
	Fairbanks D-4 IV	Fairbanks D-3 I	Fairbanks D-2 IV	Fairbanks D-1 I	Big Delta D-5 IV	Big Delta D-6 I	
45'	Fairbanks C-4 III	3350 Fairbanks C-3 II	Fairbanks C-2 III	3450 Fairbanks C-1 II	Big Delta C-5 III	3550 Big Delta C-6 II	45'
30'	Fairbanks B-4 IV	Fairbanks B-3 I	Fairbanks B-2 IV	Fairbanks B-1 I	Big Delta B-5 IV	Big Delta B-6 I	30'
15'	3349 III	3349 II	3449 III	3449 II	3549 III	3549 II	15'
64°00'	149°00'	30'	148°00'	30'	147°00'	30'	146°00'	64°00'

SAMPLE 10,000 METER GRID SQUARE

1,000m square

100,000 m SQUARE IDENTIFICATION: VG WG

GRID ZONE DESIGNATION: 6W

SAMPLE 1,000 METER REFERENCE

1. Read letters identifying the 100,000 meter square in which the point lies. — VG
2. Read large number labeling the VERTICAL grid line left of point. Estimate tenths (1,000 meters) from grid line to point. — 7 / 2
3. Read large number labeling the HORIZONTAL grid line below point. Estimate tenths (1,000 meters) from grid line to point. — 5 / 4

Example: VG7254

WHEN REPORTING OUTSIDE THE GRID ZONE DESIGNATION AREA IN WHICH THE POINT LIES, PRECEDE WITH GRID DESIGNATION. Example: 6WVG7254

FORT WAINWRIGHT, ALASKA
(INCLUDING THE YUKON COMMAND TRAINING SITE AND THE FAIRBANKS PERMAFROST STATION)
TERRAIN ANALYSIS
LINES OF COMMUNICATION

ROADS
- Hard surface, divided 4 or more lanes
- Hard surface, 4 or more lanes
- Hard surface, 2 or 3 lanes
- Loose surface, 2 or 3 lanes
- Loose surface, 1 lane
- Improved dirt
- Unimproved dirt
- Trails
- S 2 — State route marker

BRIDGE DATA
(all measurements in meters)
- A. Bridge number
- B. One way military load classification
- C. Two way military load classification
- D. Roadway width
- E. Length
- F. Overhead clearance
- ∞ Unlimited clearance
- ? No data

NOTE: Numbers refer to entries in tables.

RAILROADS
(all measurements in meters)
- Single track, standard gage
- Siding
- S — A. Bridge number
- B. Vertical clearance
- C. Horizontal clearance
- D. Length
- ∞ Unlimited clearance
- ? No data

AIRFIELDS/AIRSTRIPS
- Airfield
- Airstrip

Orientation of runway is indicated by the placement of airfields or airstrips.

PIPELINE
- S — Pipeline

HELICOPTER LANDING ZONE
- H 11 — Landing zone

DROP ZONE
- DZ 1 — Drop zone

Scale 1:125,000
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 Meters
1 0 1 2 3 4 5 6 7 Statute Miles

CONTOUR INTERVAL 200 FEET
SUPPLEMENTARY CONTOURS 100 FEET

Prepared by the Defense Mapping Agency Hydrographic/Topographic Center, Washington, D.C. for the Terrain Analysis Center, U.S. Army Engineer Topographic Laboratories, Fort Belvoir, Virginia. September 1978.

K. URBAN AREAS (CANTONMENT AREAS)

The cantonment areas of Fort Wainwright are adjacent to and east of Fairbanks, Alaska. Fort Wainwright Army Airfield divides the cantonment into two main areas. The older north section is mainly a residential area consisting of officer family housing, a couple of enlisted men barracks, and the guest house. The newer south section has most of the necessary support and storage facilities and is the more important housing and billeting area for NCOs, officers, and enlisted men. Post Headquarters is also here.

Fort Wainwright's population has been substantially reduced from its peak during the 1960's. Housing, services, and utilities which were originally designed for a much larger population are adequate for the present population. Thus, very little expansion is planned for the future. However, a community development plan to modernize the interiors, and improve the family housing areas with trees, walks, new streets, and private garages has been drawn up.

The Cold Regions Research and Engineering Laboratories (CRREL) is engaged in scientific and technical research projects such as expanding the growing season, reducing ice fog, and researching permafrost conditions. CRREL maintains an office on base (building number 4070), a permafrost station on Farmer's Loop Road just outside the post and slightly to the northeast of Fairbanks, and a 107 meter (350 foot) permafrost tunnel about 29 kilometers (18 miles) to the north.

Approximately 107 of Fort Wainwright's buildings are now being renumbered. All numbers used in this analysis reflect current information as of 2 June 1978.

TROOP BILLETS

TYPE	TOTAL NUMBER	TOTAL CAPACITY	CONDITION	REMARKS
Permanent with mess	13	2352	Good–Poor	The largest of these have 12,302 m^2 (132,424 ft^2) of floor space and house 294 men each – the two on north post (buildings #1001 and #1004) were modernized about three years ago by Alyeska (the Alaska pipeline company) while their employees used these buildings. The seven smallest have 3565.5 m^2 (38,380 ft^2) floor space and house 147 men each. The five billets just to the north of Monterey Lake are now being modernized. The five billets to the south of Monterey Lake are used only by rotating units here for winter training. They remain vacant during the summer months.
Permanent without mess	10	1290	Good–Poor	
Totals	23	3642		

BACHELOR QUARTERS

TYPE	TOTAL NUMBER	TOTAL CAPACITY	CONDITION	REMARKS

BACHELOR OFFICER QUARTERS

Permanent, Male & Female	3	60	Good	There is no longer separate quarters for males and females.
Permanent, outgranted to other agencies	4	80	Good	Most of these are controlled by the Bureau of Land Management (BLM) for smoke jumpers during the summer months. The BLM has an on-post training site and is in the process of building its own permanent facility on post.
Permanent, Transient	2	40	Good	These are buildings #1062 and #4056 (Alaska Hall which also serves as a guest house when Murphy Hall is filled).
Permanent, built as BOQ's, not presently under the Housing Officer control.	2	40	Good	Presumably these could be returned to this use, if needed. In an emergency, all BOQ facilities could house two or three times as many people.
Totals	11	220		

SENIOR ENLISTED QUARTERS

TYPE	TOTAL NUMBER	TOTAL CAPACITY	CONDITION	REMARKS
Permanent, without mess	1	20	Good	Building No. 4066; formerly nurses quarters for Bassett Army Hospital.

FAMILY QUARTERS

OFFICER FAMILY HOUSING

TYPE	NUMBER OF UNITS	NUMBER OF BUILDINGS	CONDITION	REMARKS
Senior Grade	1	1	Good	Building #1 is the Commanding Officer's home. It is a two story, wood frame building with 457 m^2 (4923 ft^2) of floor space erected in 1941.
Field Grade	59	22	Good	There are two family quarters for Colonels – one at each end of building #1047. This is a 7 family wood frame structure with 1813 m^2 (19,518 ft^2) floor space erected in 1959. Lieutenant Colonels and Majors have 57 family quarters in 22 buildings, which range in floor size from 2235 m^2 (24,057 ft^2) for 12 families to 390 m^2 (4202 ft^2) for 2 families.
Company Grade	254	31	Good	CG-WOs are housed in buildings which range in floor size from 2610 m^2 (28,098 ft^2) for 14 families to 1286 m^2 (13,848 ft^2) for 8 families, most common floor space is 1286 m^2 (13,848 ft^2) for 8 families.
Totals	314	54		

K. URBAN AREAS (CANTONMENT AREAS) (Continued)

NCO FAMILY HOUSING

TYPE	NUMBER OF UNITS	NUMBER OF BUILDINGS	CONDITION	REMARKS
Senior NCO Grades (E-7, 8 & 9)	139	19	Good-Poor	NCO family housing floor area varies between 1373 m^2 (14,784 ft^2) for 8 families to 826 m^2 (8892 ft^2) for 8 families. The most spacious floor plan is 197 m^2 (2116 ft^2) for one family; and the most common is 1178 m^2 (12,680 ft^2) for 8 families. Building #4079 is a panelled house with apartments in need of work. Building #4175 is known as the Family Housing Annex for senior NCOs and is located in Fairbanks near the main gate. The annex is in the worst condition of all the housing; the roof leaks, and the whole building needs work.
Junior NCO Grades (E, 4, 5 & 6)	976	122	Good	All family housing is in permanent buildings and all quarters are equipped with appliances including washer, dryer, stove, and refrigerator, and some have a dishwasher.
Totals	1115	141		

TYPE OF FAMILY HOUSING

TYPE	NUMBER OF BEDROOMS	NUMBER OF BATHS	NUMBER OF UNITS	NUMBER OF STYLES OF LAYOUT	USER
Townhouse	2	1	424	3	All NCOs
Townhouse	3	1	930	5	640 - NCO only, 26 - Officers only, and 264 - Officers and Senior NCOs.
Townhouse	3	2	5	1	All Officers
One Floor Duplex	3	1	40	1	All Officers
Two Story Duplex	3	1	2	1	All NCOs
Rowhouse	4	2	2	1	All Officers
Flat Apartment	1	1	24	1	All NCOs
Single Family House	3	1	1	1	Senior NCO
Single Family House	No Data	No Data	1	1	Commanding Officer
Totals: 6 types			1429	15	

GUEST HOUSING

TYPE	NUMBER OF UNITS	NUMBER OF BUILDINGS	CONDITION	REMARKS
Permanent	32	1	Good	Murphy Hall, building #1045, originally built as a BOQ, serves as the post guest house. It has 4 VIP suites. When filled, Alaska Hall, building #4056, is used for additional guests.

ELECTRIC POWER

CAPACITY		CURRENT LOAD	REMARKS
Normal:	22,000 kw	Peak: 12,500 kw	Electric power is supplied from the central power plant, building #3595, on post, which uses coal-fired steam generators.
Extremely Cold Weather:	26,000 kw	Average: 11,500 kw at –46°C (–50°F)	The following standby generating facilities are available: a. Two generators, each 60 kw, at the standby steam plant, building #3705. b. Diesel-fueled 3500 kw generating plant in building #3564. c. Various other smaller units with a total capacity of 425 kw. d. North post power plant, building #1561, is coal-fired and rated at 1500 kw. This plant has been deactivated since the early 1960's and will need some work to be put back into production.
		Total consumption for Fiscal Year 1977: 49,321,000 kwh	

STEAM POWER

CAPACITY		CURRENT LOAD	REMARKS
New Section:	900,000 pounds of steam per hour	Maximum Output for a 24 Hour Period: 10,384,000 pounds of steam (November 1976)	The central boiler plant, building #3595, supplies steam to a majority of the buildings on post. It was built in two sections. The new section has 6 boilers rated at 150,000 pounds of steam per hour for each one. The old section is inactive (since approximately 1958) but its two boilers could supply 100,000 pounds of steam per hour from each.
Old Section:	200,000 pounds of steam per hour	Minimum Output for a 24 Hour Period: 2,816,000 pounds of steam (August 1977)	The following standby heating plants are available: a. North post central boiler plant, building 1561, is coal-fired and rated at 21,000 pounds of steam per hour. b. Oil-fired heating plant of 107,000 pounds of steam per hour in building #3705. This plant supplies heat to the troop billets in the brigade area only. c. Various other smaller units with a total capacity of 6,000 pounds of steam per hour.
Total	1,100,000 pounds of steam per hour	Total Steam Production October 1976 thru September 1977: 1,867,705,000 pounds of steam	Facilities are adequate for present and the foreseeable future and there are no changes expected thru 1983. No major problems exist with the equipment; however, age of the equipment does cause some minor difficulties in obtaining some small parts occasionally.

SCHOOL FACILITIES

TYPE	NAME	ENROLLMENT CAPACITY	CURRENT ENROLLMENT	SERVICE CONNECTED ENROLLMENT	REMARKS
Kindergarten through 4th grade	Aurora Elementary School	300	253	253	West end of housing area on south post.
Kindergarten through 4th grade	Chena Elementary School	425	324	324	Near fire house at east end of the south post housing area.
Kindergarten through 4th grade	Badger Road Elementary School	250	235	None	In the McKinley School Building.
5th and 6th grades	Fort Wainwright Elementary School	250	237	138	Adjacent to Aurora School.
7th and 8th grades	Tanana Junior High School	800	637	111	Military dependent children attend with other students just outside the Trainor Gate.
High School	Lathrop High School	1600	837	124	On-post high school students (grades 9 to 12) attend school in Fairbanks.
Special Education	Birch School	200	31	4	This School is open to all Borough students needing special education. It has 7 classrooms with a gym connected to one classroom and a small shop. Currently the largest class has 11 students.
Totals		3825	2554	954	On-post schools are operated by the North Star Borough School District, with offices in Fairbanks. The Army Education Center provides educational services for high school and college level courses in building #2107. The center works closely with the University of Alaska, Fairbanks Campus, 8 km (5 mi) from the post in College, Alaska, for on-post and on-campus courses.

MEDICAL FACILITIES

TYPE	CAPACITY	REMARKS
Hospital/Dental Clinic	130 beds 12 chairs	Bassett Army Hospital, building #4065, 14,421.7 m^2 (155,239 ft^2), is a five story, steel and concrete structure. Normal capacity is expandable for emergencies to a maximum of 311 beds. Complete inpatient and outpatient hospital medical treatment is available. The hospital also contains the 12 chair dental clinic with 24 hour emergency treatment available. There is a 12.2 by 12.2 m (40 by 40 ft) helipad, with corner lights, just to the north of the hospital, with a 1.8 m (6 ft) sidewalk to the emergency entrance. Height to top of hospital superstructure is 31.0 m (102 ft) and height to top of antenna is approximately 41.1 m (135 ft). As such, this is the highest man-made object on post.

RECREATION FACILITIES

On-post recreation facilities are important at Fort Wainwright because of the length, darkness, and severity of the winter day and limited availability of other activities off-post during that season. The facilities are very popular, well-maintained, and are rated as adequate in condition and availability. The heavy influx of Basic Combat Training (BCT) personnel for winter training adds an extra load. In addition to the normal recreation facilities, there is a thrift shop, the Four Seasons, a toy shop, several PX outlets, and the usual EM, NCO, and Officers Clubs for those who prefer more leisurely activities. Intramural sports are quite popular and leagues are organized for basketball, flag football, volleyball, golf, tennis, softball, and team handball. Two post chapels offer youth camps, retreats, choirs, Catholic and Protestant Services, and other activities.

TYPE	NUMBER	REMARKS
Auto Hobby Shop	1	Building #1053, 1018.2 m^2 (10,960 ft^2), has a retail sales counter for parts.
Auto Self Help	1	Building #3570, 130.0 m^2 (1400 ft^2), concrete, built 1955.
Bowling Center	1	Building #3702, 1633.0 m^2 (17,578 ft^2), concrete block, has 20 lanes and offers rental lockers and a PX snack bar.
Dependent Youth Activity	1	Building #4109, 518.4 m^2 (5580 ft^2), concrete masonry, for dependents aged 6 to 16. Sponsored activities include hockey teams, junior rifle club, teen center, and other youth projects.
Entertainment Workshop (Boat Shop)	1	In the marina support building #2062, 495.0 m^2 (5328 ft^2), wood, built 1945. From here special services will rent camping trailers, tents, fishing poles, and other equipment.
Flying Club	1	Building #1593, 147.2 m^2 (1584 ft^2).
General Educational Development Facility	1	Building #2107, 621.0 m^2 (6685 ft^2), high school and college level courses.
Golf Course and Club House	1 1	Chena Bend Golf Course, 9 hole regulation layout of 44.5 ha (109.9 acres) with two sets of tees to provide 18 playable holes. Includes driving range of 0.9 hectares (2.2 acres) and practice putting green. The club house, building #2092, 371.6 m^2 (4000 ft^2), has a pro shop, snack bar, and equipment rental facility.
Gymnasiums	2	Building #3592, 2320.5 m^2 (24,979 ft^2), steel, built 1944, with 2 basketball courts and 2 volleyball courts. The additional gymnasium, building #3452, 1984.4 m^2 (21,361 ft^2), concrete block, built 1953, is used by an average 7500 personnel per month. Activities available include basketball, weight lifting, archery, paddle ball, handball, sauna bath, and whirlpool.
Library	1	Building #3717, 1283.7 m^2 (13,818 ft^2), concrete, built 1956, has 23,000 volumes.
Rod-Gun/Skeet Club	1	Building #2060, 209.4 m^2 (2255 ft^2). The branch skeet club uses building #5040, 178.4 m^2 (1920 ft^2).

WATER SUPPLY

CAPACITY

Main (South) Water Treatment Plant

Production: 9,462,500 liters per day (2,500,000 gpd)

Clear Well Storage: 1,400,450 liters (370,000 gal)

Deluge fire protection system reservoirs:

Building Number	Capacity
2108	1,135,500 liters (300,000 gal)
2080	1,135,500 liters (300,000 gal)
3011	1,892,500 liters (500,000 gal)

CURRENT LOAD

Peak: 9,462,500 liters per day (2,500,000 gal)

Average High in July: 6,813,000 liters per day (1,800,000 gal)

Yearly Average: 4,163,500 to 4,920,500 liters per day (1,100,000 to 1,300,000 gal)

REMARKS

Wells supply all the water used on post.

The deluge fire protection system reservoirs and the clear wells at the water treatment plants constitute the only water storage facilities available. Estimated future water storage capacity required is 3,785,000 liters (1,000,000 gal).

Standby water pumps are in buildings #3596 and #3569.

WELL DATA

BUILDING NUMBER	CAPACITY LITERS PER MINUTE (GPM)	CAPACITY LITERS PER DAY (GPD)	DEPTH IN METERS (FEET)	USE	STATUS
On Main System					
1011	2839 (750)	4,087,000 (1,080,000)	20 (65)		Standby
1032	2839 (750)	4,087,000 (1,080,000)	18 (58)		Standby
1568	1893 (500)	2,725,200 (720,000)	34 (112)		Standby
3003	2271 (600)	3,270,240 (864,000)	49 (160)		Standby
3405	3785 (1000)	5,450,400 (1,440,000)	34 (110)		Standby
3563	2839 (750)	4,087,000 (1,080,000)	36 (118)	Main source	In Use
3565	4826 (1275)	6,949,260 (1,836,000)	63 (208)	Main source	In Use
3594	2839 (750)	4,087,000 (1,080,000)	34 (110)	Central (South) power plant only	In Use
4023	2839 (750)	4,087,000 (1,080,000)	34 (110)		Standby
Not On Main System					
1115	95 (25)	136,000 (36,000)	16 (52)	Domestic individual buildings	In Use
1167	95 (25)	136,000 (36,000)	No Data		In Use
1168	95 (25)	136,000 (36,000)	15 (50)	Domestic individual buildings	In Use
1172	19 (5)	27,252 (7,200)	79 (260)	Domestic individual buildings	In Use
1173	38 (10)	54,504 (14,400)	21 (68)	Domestic individual buildings	In Use
2060	95 (25)	136,000 (36,000)	24 (79)	Irrigation	In Use
2092	95 (25)	136,000 (36,000)	23 (75)	Clubhouse	In Use
5001	38 (10)	54,504 (14,400)		Property Disposal Office	In Use

SEWERAGE

All sewage from the cantonment flows to the treatment plant for the City of Fairbanks.

TELECOMMUNICATIONS

CAPACITY AND CURRENT LOAD

The post telephone exchange is located in the Communications Center, building #1060, and consists of a North Electric, 2800 line, all relay system built in 1952. There are 6500 extension phones connected to the system and approximately 2500 lines can operate at the same time.

For incoming and outgoing calls there are 30 lines connected to the trunks in Fairbanks, 10 trucks to RCA, and 30 AUTOVON trunks.

REMARKS

All telephone facilities are government owned.

The telephone exchange building is not suitable for expansion and the equipment is antiquated and repair parts difficult to obtain. A plan was drawn up to relocate in building #3023 using modern equipment.

Western Union service is available through RCA, which has a large communications facility just outside the main gate.

MARS station, building #1024, is now inactive. One radio is maintained there for contingency purposes.

For weather service data, Airfield Operations maintains a line to Air Force facilities.

Post Headquarters, building #3407, has a communications center.

K. URBAN AREAS (CANTONMENT AREAS) (Continued)

RECREATION FACILITIES (continued)

TYPE	NUMBER	REMARKS
Service Club	1	Golden North Service Club, adjacent to EM club in building #3700, 2170.1 m^2 (23,360 ft^2), features a reading room, game room, kitchen. Program includes trips, tours, and other Alaskan travel.
Skating/Hockey Rinks	1 Permanent 5 Temporary	Outdoor rink behind building #3452, flooded soon after freezing weather. The post fire department creates temporary rinks throughout the housing areas when adequate snow is available for embankments.
Players Shelter	1	Building #3454, 79.5 m^2 (856 ft^2), wood, built 1944, at the hockey rink.
Spectator Shelter	1	Building #3456, 73.6 m^2 (792 ft^2), wood, built 1944, at the hockey rink.
Skiing Area/Ski Lodge	1	North of the Chena River on Birch Hill, has two runs – one short for beginners. Lights available for night skiing. Slopes close when temperature is below –28.9°C (–20°F). Slopes served by both a poma lift in building #1178 and a rope tow. Ski lodge, building #1172, 461.5 m^2 (4968 ft^2) is located about 1.6 km (1 mile) north of cantonment area, just off of Ski Road, contains PX snack bar, fireplace, and lounge chairs.
Warm-up Shack	1	Building #1170, 44.6 m^2 (480 ft^2), located at top of ski runs on Birch Hill.
Ski Equipment Building	1	Building #1187, 223.0 m^2 (2400 ft^2), just NE of ski lodge is used for storage and rental of ski equipment.
Skill Development Center (Craft Shop)	1	Building #3009, 729.3 m^2 (7850 ft^2), metal, built 1945, activities include photography, ceramics, stonework (lapidary), wood working, and leather work. Tools, materials, and instructors are provided.
Snowmobile Club	1	Building #1166, 356.7 m^2 (3840 ft^2), clubhouse and inside work area for personnel with snowmobiles.
Theater w/stage	1	Building #4108, 948.1 m^2 (10,206 ft^2), concrete block, built 1955, 500 seats.
USO Club	1	Building #5161, 829.8 m^2 (8932 ft^2), located in downtown Fairbanks on First Avenue. Program includes gold panning trips, camera club, ballroom and square dancing, ping-pong, chess, and scheduled live entertainment.
Baseball Fields	5	
Football Fields	2	North post football field has bleachers, and south post football field has an associated track.
Softball Fields	2	
Tennis Courts	5	

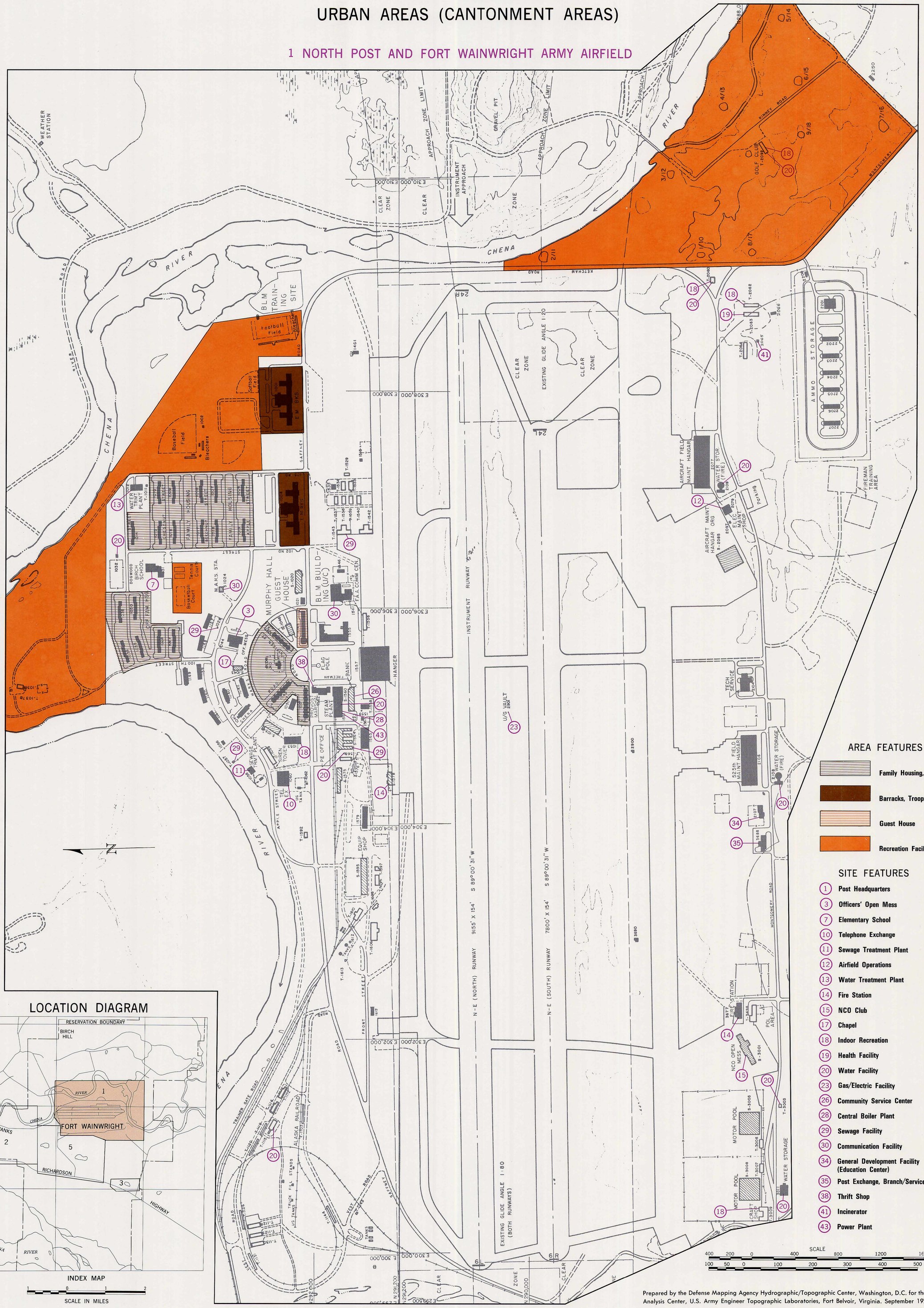
FORT WAINWRIGHT, ALASKA

(INCLUDING THE YUKON COMMAND TRAINING SITE AND THE FAIRBANKS PERMAFROST STATION)

TERRAIN ANALYSIS

URBAN AREAS (CANTONMENT AREAS)

1 NORTH POST AND FORT WAINWRIGHT ARMY AIRFIELD



LOCATION DIAGRAM

INDEX MAP

1 0 1 2

SCALE IN MILES

AREA FEATURES

- Family Housing, Officers
- Barracks, Troop Quarters
- Guest House
- Recreation Facilities

SITE FEATURES

1. Post Headquarters
3. Officers' Open Mess
7. Elementary School
10. Telephone Exchange
11. Sewage Treatment Plant
12. Airfield Operations
13. Water Treatment Plant
14. Fire Station
15. NCO Club
17. Chapel
18. Indoor Recreation
19. Health Facility
20. Water Facility
23. Gas/Electric Facility
26. Community Service Center
28. Central Boiler Plant
29. Sewage Facility
30. Communication Facility
34. General Development Facility (Education Center)
35. Post Exchange, Branch/Service Outlet
38. Thrift Shop
41. Incinerator
43. Power Plant

SCALE

400 200 0 400 800 1200 1600 FEET

100 50 0 100 200 300 400 500 METERS

Prepared by the Defense Mapping Agency Hydrographic/Topographic Center, Washington, D.C. for the Terrain Analysis Center, U.S. Army Engineer Topographic Laboratories, Fort Belvoir, Virginia. September 1978.

FORT WAINWRIGHT, ALASKA
(INCLUDING THE YUKON COMMAND TRAINING SITE AND THE FAIRBANKS PERMAFROST STATION)

TERRAIN ANALYSIS

URBAN AREAS (CANTONMENT AREAS)

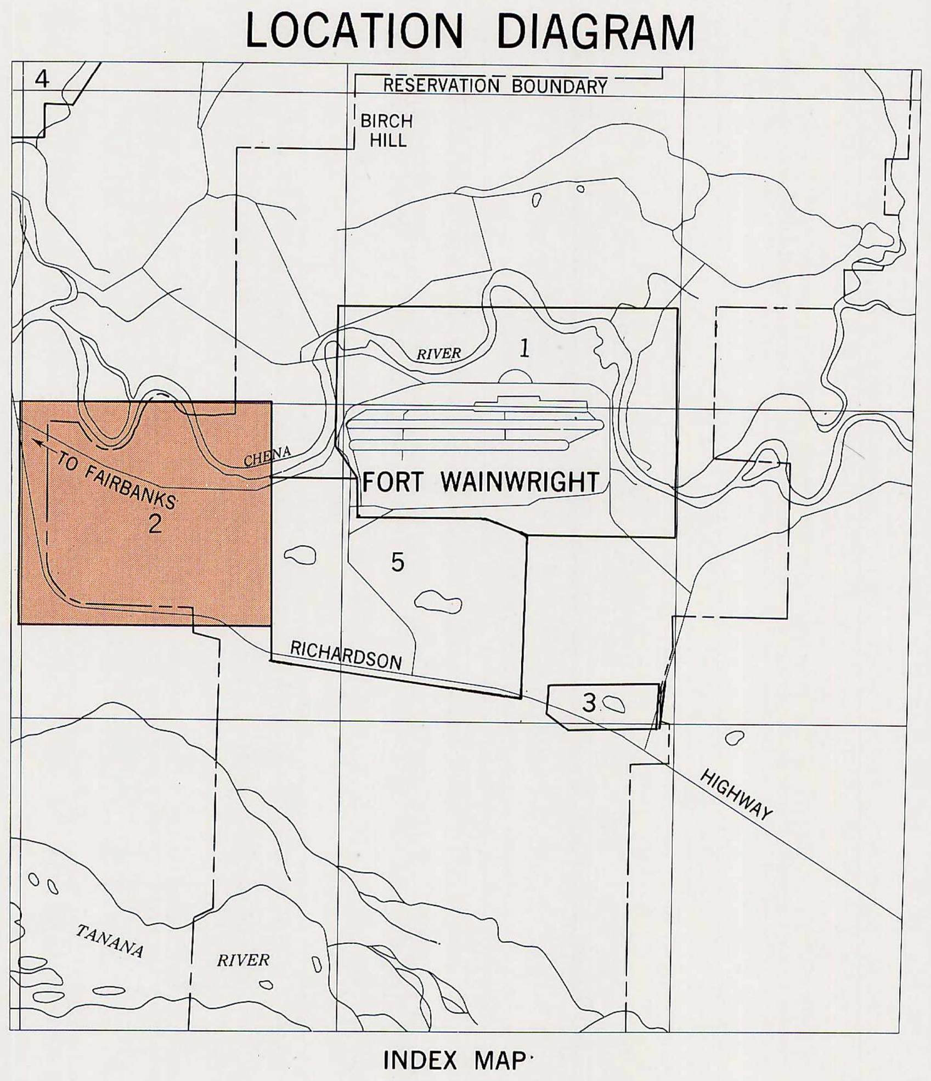
2 SOUTH POST HOUSING AREA

SCALE

400 300 200 100 0 200 400 600 800 1000 1200 1400 1600 1800 2000 FEET

100 50 0 100 200 300 400 500 METERS

LOCATION DIAGRAM



INDEX MAP

1 0 1 2

SCALE IN MILES

Proposed changes to renumbering of buildings on Fort Wainwright

PRESENT NUMBER	NEW NUMBER	PRESENT NUMBER	NEW NUMBER	PRESENT NUMBER	NEW NUMBER
1157	1065	3655	3568	3844	3485
1158	1064	3656	3454	3845	3489
1159	1063	3657	3456	3850	3493
1160	1062	3658	3032	3851	3483
1161	1061	3659	3033	3855	3475
1169	1066	3660	3031	4034	4392
1401	1514	3665	3403	4073	3565
1606	1599	3666	3442	4074	3563
1608	1598	3667	3444	4076	4108
1610	1594	3668	3446	4077	4349
1615	1593	3669	3448	4078	4109
2109	2080	3670	3413	4080	4348
2900	2112	3671	3411	4081	4346
2901	2113	3672	3401	4082	4345
3014	3726	3673	3415	4083	4343
3223	3023	3674	3417	4084	4342
3225	3025	3675	3421	4085	4340
3496	3002	3676	3479	4086	4339
3500	3200	3677	3004	4087	4337
3501	3201	3678	3407	4088	4336
3502	3202	3679	3452	4089	4334
3503	3203	3680	3487	4090	4335
3504	3204	3681	3423	4091	4338
3505	3705	3684	3481	4092	4341
3572	3725	3686	3598	4093	4344
3593	3724	3687	3450	4094	4347
3598	3597	3688	2110	4095	4328
3600	3569	3690	2111	4096	4329
3601	3567	3698	3405	4097	4333
3603	3566	3828	3409	4098	4332
3605	3564	3830	3419	4099	4330
3606	3570	3834	3425	4100	4331
3608	3562	3836	3491	4163	4247
3620	3520	3841	3440	4164	4390
3621	3521	3843	3477	4167	4391
3652	3030				

SITE FEATURES

- (2) Post Hospital
- (7) Elementary School
- (8) Main Post Chapel
- (11) Sewage Treatment Plant
- (14) Fire Station
- (16) Visitor Information Center
- (18) Indoor Recreation
- (20) Water Facility
- (22) Service Station
- (27) Flight Obstructions
- (29) Sewage Facility
- (31) Child Care Center
- (35) Post Exchange, Branch/Service Outlet
- (37) Youth Center
- (40) Heating Facility
- (42) CRREL Lab

AREA FEATURES

- Family Housing, Officers
- Family Housing, NCO
- Barracks, Troop Quarters
- Bachelor Officers Quarters, Male (Male/Female)
- Bachelor Enlisted Quarters
- Guest House
- Recreation Facilities

Prepared by the Defense Mapping Agency Hydrographic/Topographic Center, Washington, D.C. for the Terrain Analysis Center, U.S. Army Engineer Topographic Laboratories, Fort Belvoir, Virginia. September 1978.

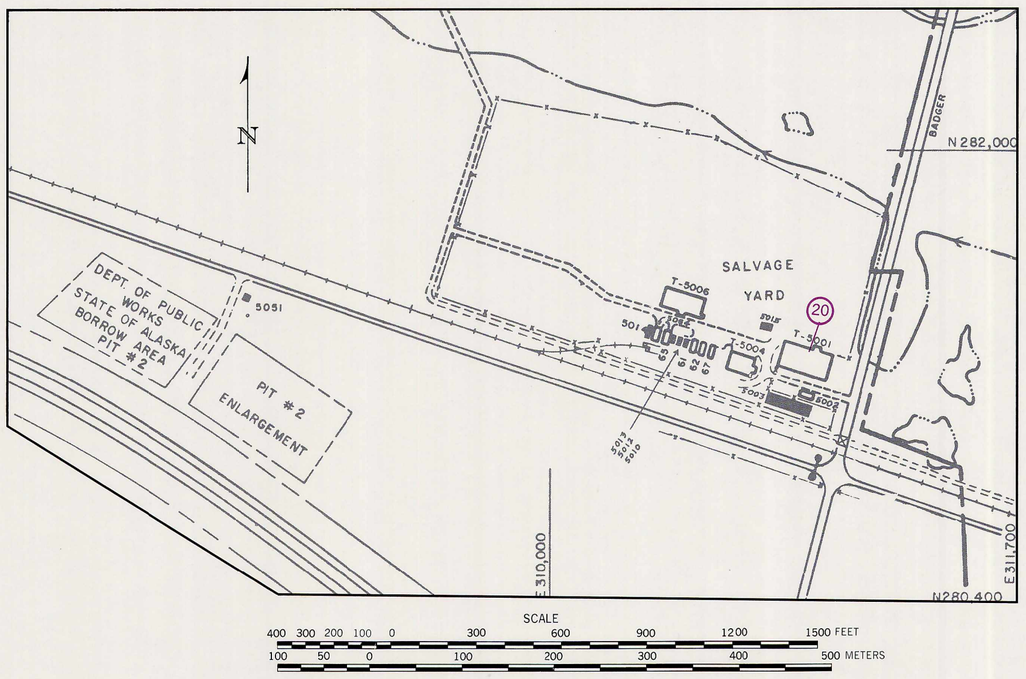
FORT WAINWRIGHT, ALASKA

(INCLUDING THE YUKON COMMAND TRAINING SITE AND THE FAIRBANKS PERMAFROST STATION)

TERRAIN ANALYSIS

URBAN AREAS (CANTONMENT AREAS)

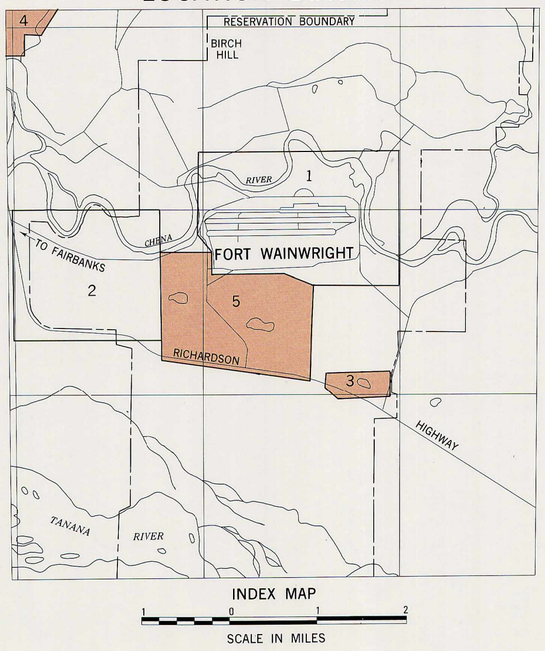
3. SALVAGE YARD



4. CRREL PERMAFROST STATION

5. SOUTH POST BARRACKS AND SUPPORT AREAS

LOCATION DIAGRAM



AREA FEATURES

- Barracks, Troop Quarters
- Recreation Facilities

SITE FEATURES

1. Post Headquarters
4. Post Exchange, Main
5. Commissary
6. Post Office
9. Post Engineers (DFAE)
13. Water Treatment Plant
18. Indoor Recreation
20. Water Facility
21. Snack Bar
22. Service Station
23. Gas/Electric Facility
24. EM Service Club
27. Flight Obstructions
28. Central Boiler Plant
29. Sewage Facility
32. QM Facilities; Laundry;(Dry Cleaning, Store Sales)
33. Bank or Credit Union
35. Post Exchange, Branch/Service Outlet
36. Post Exchange, Cafe
38. Thrift Shop
40. Heating Facility
43. Power Plant

Prepared by the Defense Mapping Agency Hydrographic/Topographic Center, Washington, D.C. for the Terrain Analysis Center, U.S. Army Engineer Topographic Laboratories, Fort Belvoir, Virginia. September 1978.

L. NON-URBAN CULTURE FEATURES

On the Fort Wainwright reservation, there are over 78 manmade features outside the cantonment areas which could either positively or negatively affect military training or operations. Most of these features depicted on the accompanying map and described below, consist of various types of buildings, truck fill/unloading stands, beacons, and power lines; many of which are associated with the various ranges on the reservation. The manmade features included are those that existed as of July 1978.

MAP NUMBER	GRID REFERENCE	DESCRIPTION
1	VG684925	Gravel truck fill stand: Currently in use.
2	VG705921	Sanitary landfill: 122,336 m^3 (160,000 yd^3) yield per year @ 49,896 grams per m^3 (110 pounds) per yd^3, closing date 1995.
3	VG704919	At landfill site: Vehicle storage building, 110.4 m^2 (1188 ft^2), wood and metal construction.
4	VG696933	Radio tower: Height 15.2 m (50 ft), metal construction.
5	VG697935	Beacon tower: Height 18.3 m (60 ft), metal construction.
6	VG695932	Radar tower: Height 15.2 m (50 ft), metal construction.
7	VG704934	Ski recreation building: 44.6 m^2 (480 ft^2), metal construction, temporary.
8	VG707926	Ski recreation building: 461.5 m^2 (4968 ft^2), metal construction, semi-permanent.
9	VG708927	Ski recreation building: 10 m^2 (108 ft^2), wood construction, temporary.
10	VG708926	Ski recreation building: 223 m^2 (2400 ft^2), wood construction, temporary.
11	VG717940	Beacon tower: Height 19.8 m (65 ft), metal construction.
12	VG725927	Petroleum truck fill stand: Pipe height 4.9 m (16 ft), abandoned.
13	VG727924	Petroleum truck fill stand: Pipe height 4.9 m (16 ft), abandoned.
14	VG727929	Beacon tower: Height 18.3 m (60 ft), metal construction.
15	VG730930	POL storage tanks: 26 metal tanks, capacity 189,250 liters (50,000 gal), underground, abandoned.
16	VG731932	POL truck unloading stand: Abandoned.
17	VG736933	Ammunition dump: 28 ammunition ready magazines, 169.7 m^2 (1827 ft^2), concrete construction, permanent.
18	VG736921	Ammunition renovation shop: 101.3 m^2 (1090 ft^2), concrete block construction, permanent.
19	VG737922	Beacon tower: 14.6 m (48 ft), permanent.
20	VG738928	Revetment: Length 30.5 m (100 ft), width 15.2 m (50 ft), height 3.7 m (12 ft), dirt, permanent.
21	VG736901	Beacon tower: Height 18.3 m (60 ft), metal construction, permanent.
22	VG690930	16 Storage tanks: 14 @ capacity 37,850 liters (10,000 gal), steel, bolted: two @ capacity 94,625 liters (25,000 gal), steel welded; currently in use.
23	VG684929	Pump station: 139 m^2 (1496 ft^2), concrete block construction, temporary.
24	VG685929	POL terminal facility: Building, 125.7 m^2 (1353 ft^2), corrugated metal, permanent.
25	VG684927	POL distribution building: 165 m^2 (1776 ft^2), corrugated metal, permanent.
26	VG683926	Tank truck fill stand: 34.2 m^2 (368 ft^2), wood and metal, construction, temporary.
27	VG685914	Sentry station: 5.9 m^2 (64 ft^2), wood and masonry construction, permanent.
28	VG687913	Flammable material storage house: 594.2 m^2 (6396 ft^2), concrete block, permanent.
29	VG687910	Lube drum storage area: Barrel capacity 208.2 liters (55 gals), dirt area, enclosed by 2.4 m (8 ft) high fence, temporary.
30	VG685904	General purpose laboratory: 356.7 m^2 (3840 ft^2), metal, temporary.
31	VG686900	Boat ramp: Width 12.2 m (40 ft), gravel, temporary.
32	VG729901	Gravel truck loading station: 60.2 m^2 (648 ft^2), metal I-beam and wood plank construction, temporary.
33	VG729901	Gravel truck loading station.
34	VG699935	Vehicle storage shed: 52 m^2 (560 ft^2), metal/frame construction, temporary.
35	VG698934	Storage shed, 5.9 m^2 (64 ft^2), metal, temporary.
36	VG698932	Storage shed: 5.9 m^2 (64 ft^2), metal, temporary.
37	VG714864	At Range Central (M72 launcher, 90 mm recoilless rifle): Four firing points, subcaliber only-familiarization, training, permanent.
38	VG701866	Office building: 50.2 m^2 (540 ft^2), wood frame, permanent.
39	VG709864	At Range Central (50 caliber machine gun, 40 mm grenade launcher, M79 and M72 launchers, 90 mm recoilless rifle): Four firing points, accuracy pad, training, permanent.
40	VG708864	At Range Central (hand grenade): Four firing points, familiarization, training, permanent.
41	VG707864	At Range Central, 25.4 m (1000 in) range, (M-14, M-16-zero): 20 firing points, permanent.
42	VG704864	At Range Central (7.62 mm to 50 caliber machine gun): Training, qualifying, permanent.
43	VG706864	At Range Central (pistol): 20 firing points, "all" handguns, training, qualifying, permanent.
44	VG705864	At Range Central (40 mm range) (M79 (HE), M72): Four firing points, training, familiarization, permanent.
45	VG699873	At Range Central (known distance), (small arms – 5.56 mm to 50 caliber machine gun): General storage building, 178.4 m^2 (1920 ft^2), metal construction, temporary.
46	From VG682914 To VG685899	Buried power cable: 69 KV, Golden Valley Electric.
47	From VG680880 To VG687880	Buried power cable: 69 KV, Golden Valley Electric.
48	From VG687880 To VG731870	Buried power cable: 138 KV, Golden Valley Electric.
49	VG993752	At Yukon Command Training Area (record trainfire-zero), (5.56 mm and 7.62 mm small arms): Eight firing points, qualifying.
50	VG990744	At Yukon Command Training Area: 10 to 12 buildings, former winter bivouac area, fuel tank, abandoned.
51	VG990748	At Manchu Lake Firing Range: Range house, 42.4 m^2 (456 ft^2) with generator room, wood frame; permanent; control tower, 11.9 m^2 (128 ft^2) wood frame, temporary; detached latrine, 14.9 m^2 (160 ft^2), wood frame, permanent.
52	WG340795	Pine Creek Airstrip: 1.5 to 1.8 m (5 to 6 ft) of brush overgrowth in area, abandoned.
53	WG325795	Old Mining Camp: Ruins.
54	WG025720	Target Range: Abandoned.
55	WG126709	At Nike Alaska Peter "B" Site: EM barracks with mess, 2368.9 m^2 (25,499 ft^2), concrete block; building and radar tower, 388 m^2 (4276 ft^2), 9.8 m (32 ft) high; water pump station, 27.9 m^2 (300 ft^2), concrete; water storage tank, capacity 283,875 liters (75,000 gal), diameter 4.9 m (16 ft), height 7.3 m (24 ft); two radar towers (navigation and traffic aids) on water tank, 51.1 m^2 (550 ft^2) each, metal; radar tower (target tracking), 25.5 m^2 (274 ft^2), metal; sentry station, 13.4 m^2 (144 ft^2), wood frame; missile warhead building, 652.3 m^2 (7021 ft^2), concrete and frame; water pump building, 7.5 m^2 (81 ft^2), wood; flammable material storehouse, 11.7 m^2 (128 ft^2), frame; sentry station, 8.9 m^2 (96 ft^2), frame; reservoir, diameter 42.7 m (140 ft), earth filled dam, height 9.1 m (30 ft); high explosive magazine, 1.2 x 1.2 m (4 x 4 ft), height 0.9 m (3 ft), concrete/dirt roof; helicopter pad, 1852.9 m^2 (19.944 ft^2), gravel; site abandoned.
56	WG131624	At Nike Alaska Mike "C" Site: Battery control building, 2367 m^2 (25,479 ft^2), concrete block; pump house, 25.8 m^2 (278 ft^2), wood frame; radar building, 241.6 m^2 (2601 ft^2), height 11.9 m (39 ft), metal; water storage tank, capacity 283,375 liters (75,000 gal), 35.7 m^2 (384 ft^2), steel; two radar towers on water tank, 51.2 m^2 (551 ft^2), steel; high explosive magazine (igloo storage, self-propelled motor storage), 75.2 m^2 (810 ft^2), concrete/dirt roof; high explosive magazine (igloo storage); radar tower (target tracking), height 7.2 m (23.5 ft), metal; missile warhead building, 546.3 m^2 (5880 ft^2); flammable material storage, 14.3 m^2 (154 ft^2), concrete reinforced; high explosive magazine, 1.5 m^2 (16 ft^2), height 0.9 m (3 ft), concrete reinforced/dirt covered; helicopter pad, 1546.2 m^2 (16,643.6 ft^2), gravel; site abandoned.
57	VG680405	At Blair Lakes Bombing/Gunnery Range (attack aircraft training and proficiency testing in gunnery and bombing techniques): Control tower and flank tower, height 16.8 m (55 ft); two radar reflectors, height 6.4 m (21 ft); 22 triangular range markers, 6.1 x 6.1 x 6.1 m (20 x 20 x 20 ft); helicopter pad, 464.5 m^2 (5000 ft^2), dirt surface; three fuel tanks, two @ capacity 94,625 liters (25,000 gal), one @ capacity 7570 liters (2000 gal); support building, 334.4 m^2 (3600 ft^2); dormitory, 312.1 m^2 (3360 ft^2).
58	VG698876	At TN6 Range (trainfire): 10 firing lanes, 70 targets, with firing line foxholes.
59	VG705865	At Range Central (81 mm mortar), (subcaliber), (aerial gunnery motor artillery): One firing point.
60	WG045690	Arctic Survival Training Area: No Data
61	From VG696879 To VG730874	Buried power cable: 69 KV, Golden Valley Electric.
62	From VG684925 To VG720939 From VG720939 To VG740922	Aerial power lines: 12.5 KV, government owned, height of poles 9.1 m (30 ft).
63	From VG684914 To VG704919	Aerial power lines: 12.5 KV, government owned, height of poles 9.1 m (30 ft).
64	From VG685929 To VG693913	Aerial power lines: 12.5 KV, government owned, height of poles 9.1 m (30 ft).
65	From VG719915 To VG750924	Aerial power lines: 12.5 KV, government owned, height of poles 9.1 m (30 ft).
66	From VG718937 To VG724927	Aerial power lines: 12.5 KV, government owned, height of poles 9.1 m (30 ft).
67	From VG680867 To VG714866	Aerial power lines: 12.5 KV, government owned, height of poles 9.1 m (30 ft).
68	From VG712877 To VG724848	Aerial power lines: 12.5 KV, government owned, height of poles 9.1 m (30 ft).
69	From VG711865 To VG712862	Aerial power lines: 12.5 KV, government owned, height of poles 9.1 m (30 ft).
70	From VG698908 To VG712907	Railroad siding: Length 1372 m (4500 ft), crushed stone ballast material, abandoned.
71	VG738929	Revetment: Length 30.5 m (100 ft), width 15.2 m (50 ft), height 3.7 m (12 ft), dirt, permanent.
72	VG743929	Revetment: Length 30.5 m (100 ft), width 15.2 m (50 ft), height 3.7 m (12 ft), dirt, permanent.
73	VG741930	Revetment: Length 60.9 m (200 ft), width 15.2 m (50 ft), height 3.7 m (12 ft), dirt, permanent.
74	VG742926	Revetment: Length 60.9 m (200 ft), width 15.2 m (50 ft), height 3.7 m (12 ft), dirt, permanent.
75	VG678842	Tower: Height 12.2 m (40 ft), wood construction, temporary.
76	VG674833	Tower: Height 12.2 m (40 ft), wood construction, temporary.
77	VG672823	Tower: Height 12.2 m (40 ft), wood construction, temporary.
78	VG667813	Tower: Height 12.2 m (40 ft), wood construction, temporary.

FORT WAINWRIGHT, ALASKA

(INCLUDING THE YUKON COMMAND TRAINING SITE AND THE FAIRBANKS PERMAFROST STATION)

TERRAIN ANALYSIS

NON-URBAN CULTURE FEATURES

- Truck Fill/Unloading Stand
- Sanitary Fill
- Building
- Radio Tower
- Beacon
- Radar
- Tanks, oil
- Ammunition Dump
- Revetment
- Pumping Station
- Observation Post
- Storage Area
- Boat Ramp
- Firing Lanes or Training Area
- Cable (underground), power
- Abandoned Airstrip
- Ruins
- Power Lines (overhead)
- Abandoned Railroad Siding
- Tower, use unknown

NOTE: Numbers refer to entries in tables.

FAIRBANKS INSET - SCALE 1:50,000

SEE INSET

FORT WAINWRIGHT MILITARY RESERVATION

YUKON COMMAND TRAINING SITE

BLAIR LAKE AIR FORCE RANGE

MIL RES (APPROX)

TANANA

Scale 1:125,000

CONTOUR INTERVAL 200 FEET
SUPPLEMENTARY CONTOURS 100 FEET

1:50,000 SHEET INDEX
Series Q701

Fairbanks D-4 IV	Fairbanks D-3 I	Fairbanks D-2 IV	Fairbanks D-1 I	Big Delta D-6 IV	Big Delta D-5 I	
Fairbanks C-4 II	Fairbanks C-3 III	Fairbanks C-2 IV	Fairbanks C-1 I	Big Delta C-6 III	Big Delta C-5 II	
Fairbanks B-4 IV	Fairbanks B-3 I	Fairbanks B-2 IV	Fairbanks B-1 I	Big Delta B-6 IV	Big Delta B-5 I	

SAMPLE 1,000 METER REFERENCE

1. Read letters identifying the 100,000 meter square in which the point lies: VG
2. Read large number labeling the VERTICAL grid line left of point. Estimate tenths (1,000 meters) from grid line to point: 7
3. Read large number labeling the HORIZONTAL grid line below point. Estimate tenths (1,000 meters) from grid line to point: 2 5 4

Example: VG7234

WHEN REPORTING OUTSIDE THE GRID ZONE DESIGNATION AREA, IN WHICH THE POINT LIES, PREFIX THE GRID ZONE DESIGNATION. Example: 6WVG7234

Prepared by the Defense Mapping Agency Hydrographic/Topographic Center, Washington, D.C. for the Terrain Analysis Center, U.S. Army Engineer Topographic Laboratories, Fort Belvoir, Virginia. September 1978.

III. OFF-POST FEATURES

Off-Post Features covered by this study and described in the accompanying tables consist of airfields and urban areas. Locations of these features are illustrated on the accompanying map.

AIRFIELDS: Fairbanks International Airport, Eielson Air Force Base, and Nenana Municipal Airport are within a 50-mile radius of the Fort Wainwright Cantonment Area; each is capable of handling cargo-troop transport aircraft equivalent to the C-130 Hercules or larger. In addition, during the winter months when the ground is frozen, aircraft are able to utilize several small, private, gravel airstrips in the area.

URBAN AREAS: The city of Fairbanks is adjacent to the western edge of Fort Wainwright, and is the only urban area with a population greater than 2500 within a radius of 50-miles of the Fort Wainwright Cantonment Area. Due to the physical limitations of the city of Fairbanks most of the population lives outside the city limits. The data provided are for the Greater Fairbanks Area, including the Fairbanks North Star Borough.

A. AIRFIELDS

NAME: LOCATION: TYPE AND CLASSIFICATION	ELEVATION AND STATUS	RUNWAY DESCRIPTION*	TAXIWAY; PARKING APRON; AND HARDSTAND AREA DESCRIPTION	BUILDING DESCRIPTION	POL FACILITIES **	NAVIGATIONAL AIDS	REMARKS
Name: Fairbanks International Airport; **Geographic Coordinates:** 64°49'N 147°52'W; **Type:** Civil **Classification:** Airfield.	**Elevation:** 132 m (434 ft); **Status:** Operational.	**Longest runway:** 3139 m long, 45.7 m wide (10,300 ft long, 150 ft wide); azimuth: 010°–190°; maximum weight bearing capacity S100, T200, TT400; asphalt surface in good condition. **Runway 2:** 975 m long, 18.3 m wide (3200 ft long, 60 ft wide); azimuth: 010°–190°.	**Taxiways:** 3 asphalt taxiways; all with weight bearing capacity of 345,000 lbs. Main taxiway: 3139 m x 23 m (10,300 ft x 75 ft). **Parking Aprons:** 3 parking aprons; all with weight bearing capacity of 300,000 lbs; 1. 457 m x 213 m (1500 ft x 700 ft). asphalt; 2. 183 m x 76 m (600 ft x 250 ft). concrete; 3. 366 m x 61 m (1200 ft x 200 ft). asphalt; **Hardstand Areas:** 1 hardstand; 14,864 m^2 (160,000 ft^2). 1 general aviation ramp.	**Hangars:** 2 hangars, both are 46 m x 46 m (152 ft x 152 ft). **Terminal building:** 1 terminal building; 2 ose docks used for storage. **Maintenance buildings:** 1 fire station 465 m^2 (5000 ft^2); 1 warehouse 2,787 m^2 (30,000 ft^2); 6 shops (welding, machine, wheel and tire, hydraulic; engine build-up, and avionics).	**Grades of fuel:** 80/87, 100/130, JP-4, Jet Fuel ASTM type B without icing inhibitor. **Aviation oils:** D-1100. **Oxygen:** LHOX. oxygen servicing.	**Lighting:** Rotating flashing beacon; high and low intensity runway and approach lights; visual approach slope indicator systems; and runway centerline lights. **Communications and Navigation:** VORTAC System: (combined VOR and TACAN) UHF navigational facility consisting of omni-directional course and distance information; and VHF omni-directional radio range. System is 3.7 nautical miles from airfield. VORTAC unusable 305° to 325° beyond 40 nautical miles below 7000 ft.	Includes Fairbanks International Seaplane facility under control of Fairbanks International Airport. Military and commercial aviation fuels are used. Storage areas and minor airframe and powerplant repairs. Aerodrome is only partially covered by USAF NOTAM system, but does not maintain a Military NOTAM file. (For complete information, Civil NOTAMs must also be consulted). Civil NOTAM service is available.
Name: Eielson Air Force Base; **Geographic Coordinates:** 64°40'N 147°06'W; **Type:** Military **Classification:** Airfield.	**Elevation:** 166 m (545 ft); **Status:** Operational.	**Runway:** 4419 m long, 45.7 m wide (14,500 ft long, 150 ft wide); azimuth: 130°–310°; maximum weight bearing capacity S155, T180, TT290; asphalt surface in good condition.	**Taxiways:** asphalt taxiways; **Parking Aprons:** 2 asphalt parking aprons; 1. 1594 m x 160 m (5230 ft x 525 ft) 2. 1280 m x 91 m (4200 ft x 300 ft). **Hardstand Areas:** 9 refueling hardstands; concrete all 41 m x 23 m (135 ft x 75 ft).	**Hangars:** 6 hangars (all heated) with dimensions of 1) 91 m x 91 m (300 ft x 300 ft); 2) 62 m x 61 m (202 ft x 200 ft); 3) 46 m x 37 m (150 ft x 120 ft); 4) 90 m x 26 m (295 ft x 84 ft); 5) 55 m x 46 m (180 ft x 150 ft); 6) 46 m x 24 m (152 ft x 80 ft). **Maintenance buildings:** 8 shops (machine, sheet metal, paint, hydraulic, parachute, engine build-up, instrument, and welding.	**Grades of fuel:** 115/145, JP-4 **Aviation oils:** D-1100, 1005, 1010, and turbine engine oil. **Supporting fluids and systems:** SP, W, WAI, PRESAIR; Water, Thrust Augmentation-Jet Aircraft; Water-Alcohol Injection Type, Thrust Augmentation-Jet Aircraft; Air Compressors rated 3000 PSI or more.	**Lighting:** Rotating flashing beacon; high and low intensity runway and approach lights; sequenced flashing lights; and visual approach slope indicator systems. **Communications and Navigation:** Has VOR and TACAN. VOR unreliable 020° to 070° and 120° to 290° because of terrain considerations.	Military aviation fuels are the only fuels used. Aerodrome is fully covered by USAF NOTAM system and maintains a Military NOTAM file. Civil NOTAM service is available. Uncontrolled vehicles on ramp and taxiways. Overhead traffic pattern 2200 ft above MSL.
Name: Nenana Municipal Airport; **Geographic Coordinates:** 64°33'N 149°04'W; **Type:** Civil **Classification:** Airfield.	**Elevation:** 110 m (360 ft); **Status:** Operational.	**Runway:** 1907 m long, 45.7 m wide (6256 ft long, 150 ft wide); azimuth: 030°–210°; maximum weight bearing capacity unknown at pre-asphaltic concrete in good condition.	**Taxiways:** 2 taxiways; both have gravel surface stable for C-130; ST155. 1. 23 m (75 ft) wide 2. 85 m (280 ft) wide. **Parking Aprons:** 2 parking aprons; both have gravel surface stable for C-130; ST155. 1. 533 m x 152 m (1750 ft x 500 ft). 2. 107 m x 15 m (350 ft x 50 ft).	**Service buildings:** 1 building used as flight service station. **Refueling Areas:** six refueling areas; asphalt surface, all 488 m x 31 m (1600 ft x 100 ft).	**Grades of fuel:** 80/87, 100/130, Jet Fuel ASTM Type A-1. **Oxygen:** Low pressure oxygen servicing.	**Lighting:** Rotating, flashing beacon and low intensity runway lights. **Communications and Navigation:** VORTAC System; (combined VOR and TACAN) UHF navigational facility consisting of omni-directional course and distance information; and VHF omni-directional radio range. System is 2.7 nautical miles from airfield.	Aerodrome is only partially covered by USAF NOTAM system, but does not maintain a military NOTAM file. (For complete aerodrome information Civil NOTAMs must also be consulted). Civil NOTAM service is available. Runway lights are unreliable and operate from taxiway to a point 1067 m (3500 ft) northeast.

*Note: Runway weight bearing capacity in pounds (gross weight of aircraft) is determined by adding 000 to figure following S, T, ST, TT. Runway weight bearing capacity given is for unlimited operations. Aircraft weight higher than given requires prior permission from aerodrome controlling authority.

S – Runway weight bearing capacity for aircraft with single-wheel type landing gear (C-47, F100).
T – Runway weight bearing capacity for aircraft with twin-wheel type landing gear (C-94).
ST – Runway weight bearing capacity for aircraft with single-tandem landing gear (C-130).
TT – Runway weight bearing capacity for aircraft with twin-tandem type (include quadricycle) landing gear (B-52, C-135).
TDT – Runway weight bearing capacity for aircraft with twin-delta tandem landing gear (C-5).

For further information, see DOD Flight Information Publication (enroute IFR-Supplement, Alaska).

**Note: Aviation oils listed as 1005 and 1010 are jet engine oils; the one noted as D-1100 is a reciprocating engine oil.

B. URBAN AREAS

NAME AND LOCATION

Fairbanks, Alaska
64°52'N 147°42'W
Located on the Chena and Tanana Rivers in central Alaska.

POPULATION

1970 – 30,618
1975 – 50,038
1980 – 57,205 (projected)
The population of Greater Fairbanks reached a high in 1976 of 60,247 because of the Trans-Alaska Oil Pipeline construction. This was an increase of 20% over the previous year. A projected population decrease and alleviation of stress on public utilities and other facilities should be felt by 1978. Population densities per square mile for the 23 planning areas of the Fairbanks North Star Borough range from 64 in the outlying areas of Chena Ridge, Nenana, and Country Club to 1241 in the Central City. Nearly all areas of the North Star Borough experienced a population increase on the order of 100 to 600% between 1973 and 1976. The small projected decrease will do little to modify this expansion.

HOUSING AVAILABILITY

Compiled February 1978, except where indicated.
Number Houses for Sale: 108
Number Houses for Rent: 72
Average Monthly Rent:
1 bedroom: $283
2 bedroom: $431
3 bedroom: $462
4 or more bedroom: $475
Percent Vacant: No Data
New House Starts: 641 (1977)
Number of Sales: 244 (1977)
Average Sale Price:
2 bedroom: $62,200
3 bedroom: $80,900
4 or more bedroom: $92,700
Number of Apartments for Rent: 923
Average Monthly Rent:
1 bedroom: $365 (unfurnished)
1 bedroom: $378 (unfurnished)
2 bedroom: $437 (unfurnished)
2 bedroom: $482 (unfurnished)
3 or more bedroom: $517
Percent Vacant: No Data
New Apartment Starts: 920 (1977)
In addition, there are 34 mobile homes available at average rent of $330, and 32 cabins available at average rent of $226.
Demand has decreased, causing sale prices and rents to decline lately as a result of the completion of the Trans-Alaska Oil Pipeline and workers departing.
Total number of all housing in Fairbanks North Star Borough.
Single Family Houses: 8800
Mobile Homes: 3000
Apartments: 6000
Other: 200

EDUCATION FACILITIES

ELEMENTARY
1970 enrollment – 4938
1975 enrollment – 5257
1980 enrollment – 4600 (projected)
Capacity – 5700
Number of Schools – 14
JUNIOR HIGH
1970 enrollment – 1240
1975 enrollment – 1623
1980 enrollment – 3300 (projected)
Capacity – 2200
Number of Schools – two
HIGH SCHOOL
1970 enrollment – 2382
1975 enrollment – 2795
1980 enrollment – 3300 (projected)
Capacity – 3300
Number of Schools – six
The Fairbanks North Star Borough School District employs 1125 people, 670 of whom are certified teachers.
The budget for the 1976–1977 school year was $27.9 million. Any impact on the school system of Fairbanks will be more a result of general growth than of pipeline related in-migration.
Student/teacher ratios range from 1/16 to 1/26.
Special education and career education is available.
UNIVERSITY OF ALASKA
1970 enrollment – No Data
1975 enrollment – 2675
1980 enrollment – 8000 (projected)
Annual budget – $23.8 million

MEDICAL FACILITIES

There are 82 doctors and 29 dentists in Fairbanks; 81 doctors and 15 dentists are on staff at Fairbanks Memorial Hospital.
Doctor/population ratio: 1/610
Dentists/population ratio: 1/1725
Fairbanks Memorial Hospital is the only such facility in the City of Fairbanks. There are 126 licensed beds at present; 155 upon completion of new addition in June of 1978.
There is an intensive care and coronary care unit (ICU/CCU) with one bed at Fairbanks Memorial Hospital. When the new addition is completed there will be eight ICU/CCU beds with six step-down beds.

RECREATIONAL FACILITIES

Parks: 36
Athletic Fields: seven
Tennis Courts: 4
Golf Courses: two nine-hole short courses.
In addition, there are 16 tennis courts and one athletic field at the University of Alaska.

PUBLIC UTILITIES

SEWAGE DISPOSAL
Number of Plants: Three plants operated by the City of Fairbanks, University of Alaska, and the International Airport. All serve parts of the city.
Type of Treatment: University and airport systems designed for secondary treatment. Primary treatment plant on Chena River closed in 1976 by Fairbanks North Star Borough as the secondary phase of the Tanana River plant began operation. The tertiary phase of the new plant will begin operation in the near future. Outlying areas of Fairbanks are served by septic tanks; local controls ban their use in known permafrost regions.
Flow Capacity 30.3 million liters per day (8.0 million gallons per day) for three plants in 1977.
Actual Flow: 20.8 million liters per day (5.5 million gallons per day) for three plants in 1977.

HEATING FUELS
Types Available: Most households in Fairbanks are heated by oil burning furnaces; fuel oil is distributed by approximately 10 local, independent dealers. Propane is available from one local distributor.
Expansion Plans: Fuel oil delivery routes will be expanded as city population increases.

TELEPHONE SERVICE
Source: Operated by Municipal Utilities System since 1948.
Number of Telephones: 14,569 residential, business, and coin phones.
Adequacy of Service: Breakdowns and service interruptions are common. In a 1976 survey, 69% of the residents classified service as being poor, and below their expectations.
Expansion Plans: Since 1975 the Municipal Utilities System has planned 4 additional exchanges.
As of 1977 no action has been taken.

ELECTRIC POWER
Source: The Municipal Utilities System (MUS) operates nine generators with a total capacity of 63,345 kilowatts, and Golden Valley Electric Association (GVEA) operates 16 generators with a total capacity of 166,000 kilowatts. All the energy generated for the Fairbanks area is 14% diesel, 62% oil-fired gas turbine type, and 24% coal-fired steam turbine type. MUS serves 75% of Fairbanks proper; GVEA serves 25% of the city, as well as the outlying areas.
Expansion Plans: 70,000 kilowatt plant in North Pole by December 1977, 150 kilowatt coal-fired generator in Healy and Devil's Canyon hydroelectric project.

WATER SUPPLY
Source: College Utilities and Municipal Utilities Systems pump water from the Chena River and operate three wells, a storage, and a treatment and distribution system. Outlying areas have private individual wells. Five private companies deliver water to some households; 1893 liters (500 gal) at a time.
Adequacy of Service: Adequate, but use has risen recently. In summer the treatment plant may operate at greater than normal capacity.
Expansion Plans: More wells to be drilled as needed.

FORT WAINWRIGHT, ALASKA

(INCLUDING THE YUKON COMMAND TRAINING
SITE AND THE FAIRBANKS PERMAFROST STATION)

TERRAIN ANALYSIS

OFF-POST FEATURES

- Urban areas
- Airfield
- Cantonment Area

Prepared by the Defense Mapping Agency Hydrographic/Topographic Center, Washington, D.C. for the Terrain Analysis Center, U.S. Army Engineer Topographic Laboratories, Fort Belvoir, Virginia. September 1978.

IV LIST OF SOURCES

DOCUMENTS

1. American Publishers Inc. Fort Wainwright. No date. San Diego, CA.
2. American Publishers Inc. The Great Land. 1977. San Diego, CA.
3. Community Information Center. The Fairbanks Petrochemical Study. March 1978. Fairbanks, AK.
4. Defense Intelligence Agency. Suitability for Cross-Country Movement. Basic Terrain study for 1:250,000 scale map, Fairbanks, AK. 1964. Washington, DC.
5. Defense Intelligence Agency. Suitability for Cross-Country Movement-Summer. Keyed to U.S. Geological Survey 1:250,000 scale map, 1960, Fairbanks, AK. 1967. Washington, DC.
6. Defense Intelligence Agency. Suitability for Cross-Country Movement-Winter. Keyed to U.S. Geological Survey 1:250,000 scale map, 1960, Fairbanks, AK. 1967. Washington, DC.
7. Defense Intelligence Agency. Terrain Study of the Exercise Polar Strike Area, Yukon-Tanana Region, Alaska. 1964. Prepared by the Military Geology Branch, U.S. Geological Survey. Washington, DC.
8. Department of the Army, U.S. Armed Forces Command. Installation Inventory of Military Real Property, Fairbanks Permafrost Station. March 1977. Washington, DC.
9. Department of the Army, U.S. Armed Forces Command. Installation Inventory of Military Real Property, Fort Wainwright, March 1977. Washington, DC.
10. Environmental Data Service, National Climatic Center National Oceanic and Atmospheric Administration. Local Climatological Data: Annual Summary with Comparative Data, Fairbanks, AK. 1977. Asheville, NC.
11. Fison, Susan R. and Cindy L. Quisenberry. Impact Information Center Final Report–Fairbanks North Star Borough. 1977. Community Information Center, Fairbanks, AK.
12. French, Hugh M., The Periglacial Environment. 1976. Longman Inc. New York, NY.
13. Headquarters, Department of the Army. Real Estate Inventory of Army Military Real Property, Army Regulation No. 405-45. March 1977. Washington, DC.
14. Headquarters, 172nd Infantry Brigade (Alaska), Office of the Commanding General. 172nd Infantry Brigade (Alaska) Natural Resources Conservation Program. 1978. Fort Richardson, AK.
15. Institutes of Arctic Environmental Engineering and Water Resources, University of Alaska. Environmental Atlas of Alaska. September 1969. College, AK.
16. Lyon Associates Inc. Future Development Plan, Analytical Report/Environmental Assessment, Fort Wainwright, Alaska. November 1976. Anchorage, AK.
17. Nautical Almanac Office, U.S. Naval Observatory. Nautical Twilight and Sunrise and Sunset Tables at Fort Wainwright, Alaska. No date. Washington, DC.
18. Richard, Warren E. and Charles W. Slaughter. "Thaw and Erosion on Vehicular Trails in Permafrost Landscapes." Journal of Soil and Water Conservation, Vol. XXVIII No. 6, November–December 1973; pp. 263–265
19. The University of Alaska, Arctic Environmental Information and Data Center. Alaska Regional Profiles, Yukon Region. 1977. Anchorage, AK.
20. U.S. Air Force, Environmental Technical Application Center, U.S. Naval Weather Service World-Wide Airfield Summaries. Vol. VIII, Part 8. October 1969. Washington, DC.
21. U.S. Army Alaska District, Corps of Engineers. Chena River Lakes Project, Alaska. Design Memorandum No. 1, Hydrology. December 1974. Anchorage, AK.
22. U.S. Army Alaska District, Corps of Engineers. The Master Plan of Fort Wainwright, Alaska. Analysis of Existing Facilities. January 1974. Anchorage, AK.
23. U.S. Army Cold Regions Research and Engineering Laboratory. Cold Regions Science and Engineering, part I, Section A2, permafrost. August 1966. Hanover, NH.
24. U.S. Army Corps of Engineers, Alaska District. Working Draft Environmental Impact Statement for Installation Utilization at Fort Wainwright. Vol. I. MTR 7574. March 1978. Prepared with the assistance of METREK Division of The MITRE Corporation. Anchorage, AK.
25. U.S. Army Corps of Engineers, Alaska District. Appendices to Working Draft Environmental Impact Statement for Installation Utilization at Fort Wainwright. Vol. II. MTR 7574. March 1978. Prepared with the assistance of METREK Division of The MITRE Corporation. Anchorage, AK.
26. U.S. Army Corps of Engineers, Alaska District and the U.S. Department of Interior, Bureau of Land Management, Alaska State Office. Working Draft Environmental Impact Statement concerning Proposed Land Withdrawal for the 172nd Infantry Brigade (Alaska) at Fort Wainwright. Vol. I. MTR 7440. June 1977. Prepared with the assistance of METREK Division of The MITRE Corporation. Washington, DC.
27. U.S. Army Corps of Engineers/Alaska District [and] METREK Division/The MITRE Corporation. Appendices to Working Draft Environmental Impact Statement for Proposed Land Withdrawal at Fort Wainwright. Vol. II. MTR 7440. June 1977. Washington, DC.
28. U.S. Army Corps of Engineers, Office of the Chief of Engineers. Building Information Schedule, Fort Wainwright. September 1976. Washington, DC.
29. U.S. Army Corps of Engineers, Snow, Ice and Permafrost Research Establishment. Some Factors Affecting Vehicular Trafficability of Snow. 1954. Fairbanks, AK.
30. U.S. Army Corps of Engineers. Terrain Study of Alaska, Part IX: Suitability for Cross-Country Movement. Engineer Intelligence Study 301. 1962. Compiled by the Military Geology Branch, U.S. Geological Survey. Washington, DC.
31. U.S. Army Corps of Engineers. Terrain Study of the Exercise Great Bear Area, Tanana Valley, Alaska. Engineer Intelligence Study 315. 1961. Compiled by the Military Geology Branch, U.S. Geological Survey. Washington, DC.
32. U.S. Army Engineer Topographic Laboratories. Terrain Data of Mount Hays Quadrangle, Fort Greely, Alaska. (Report No. 4 in the ETL Series on Remote Sensing) Report ETL-TR-74-7. August 1974. Fort Belvoir, VA.
33. U.S. Department of Agriculture, Forest Service. Alaska Trees and Shrubs. (Agriculture Handbook No. 410). 1972. Washington, DC.
34. U.S. Department of Agriculture, Forest Service. Guide to Alaska Trees. (Agriculture Handbook No. 472). 1974. Washington, DC.
35. U.S. Department of Agriculture, Soil Conservation Service. Soil Survey of Fairbanks Area, Alaska. 1963. Washington, DC.
36. U.S. Department of Agriculture, Soil Conservation Service. Soil Survey of Fort Wainwright, Alaska. 1968. Palmer, AK.
37. U.S. Department of Agriculture, Soil Conservation Service. Soil Survey of Salcha-Big Delta Area, Alaska. 1973. Washington, DC.
38. U.S. Department of Agriculture, Soil Conservation Service. A Vegetation Guide for Alaska. September 1972. Prepared in cooperation with the University of Alaska.
39. U.S. Department of Commerce, Coast and Geodetic Survey, Environmental Science Services. The Fairbanks, Alaska, Earthquakes of June 21, 1967. Rockville, MD.
40. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Service. Earthquake History of the United States. 1973 (Revised Edition). Boulder CO.
41. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. United States Government Flight Information Publication–Supplement Alaska. 4 November 1976 – 30 December 1976. Washington, DC.
42. U.S. Department of Interior, U.S. Geological Survey. Ground Water in the Permafrost Regions of Alaska. Geological Survey Professional Paper 696. 1970. Washinton, DC.
43. U.S. Department of Interior, U.S. Geological Survey, Office of Water Data Coordination. Catalog of Information on Water Data. Water resources region 19 (Alaska). Edition 1976. Reston, VA.
44. U.S. Department of Interior, U.S. Geological Survey. Schists of the Central Alaska Range. Survey Bulletin No. 1254-E. 1968. Washington, DC.
45. U.S. Department of Interior, U.S. Geological Survey. The Yukon-Tanana Region Alaska. Geological Survey Bulletin 872. 1937. Washington, DC.
46. U.S. Department of Interior, U.S. Geological Survey, Water Resources Division. Water Resources Data for Alaska. 1970 – 1975, 6 Vols. Anchorage, AK.

MAPS

47. Alaska, Cross-Country Movement–Winter. 1:50,000 Scale. Series Q701:

    Fairbanks D-1, Sheet 3450 I 1964
    Fairbanks C-1, Sheet 3450 II 1964
    Big Delta D-5, Sheet 3550 I 1964
    Big Delta C-5, Sheet 3550 II 1964
    Big Delta C-6, Sheet 3550 III 1964
    Big Delta D-6, Sheet 3550 IV 1964

    Prepared by Military Geology Branch, U.S. Geological Survey for the Defense Intelligence Agency, Washington, DC.

48. Preliminary Geologic Study of the Yukon Command Training Site. Scale 1:63,360. 1978. University of Alaska. Fairbanks, AK.
49. Geology of the Western Part of The Big Delta D-6 quadrangle, Alaska. Miscellaneous Geologic Investigations Map I-297. Scale 1:63,360. 1959. Department of the Interior, U.S. Geological Survey, Washington, DC.
50. Map showing ground water conditions in the Fairbanks D-2 SE quadrangle, Alaska. Miscellaneous Field Studies Map MF-669B. Scale 1:24,000. 1975. Department of the Interior, U.S. Geological Survey. GPO, Washington, DC.
51. Map showing construction materials in the Fairbanks D-2 SE quadrangle, Alaska. Miscellaneous Field Studies Map MF-669C. Scale 1:24,000. 1975. Department of Interior, U.S. Geological Survey, GPO, Washington, DC.

IV LIST OF SOURCES (Continued)

52. Geology of the Fairbanks (D-2) quadrangle, Alaska. Map GQ-110. Scale 1:63,360. 1958. Department of the Interior, U.S. Geological Survey, Washington, DC.

53. Geology of the Fairbanks (D-1) quadrangle, Alaska. Map GQ-124. Scale 1:63,360. 1958. Department of the Interior, U.S. Geological Survey, Washington, DC.

54. Geologic map of the Fairbanks D-2 SE quadrangle, Alaska. Miscellaneous Investigations Series Map I-942. Scale 1:24,000. 1976. Department of the Interior, U.S. Geological Survey, Reston VA.

55. Geologic map of the Fairbanks D-2 SW quadrangle, Alaska. Miscellaneous Investigations Series Map I-829-A. Scale 1:24,000. 1976. Department of the Interior, U.S. Geological Survey, Reston VA.

56. Geologic map of the Fairbanks quadrangle, Alaska. Miscellaneous Geologic Investigations Map I-455. Scale 1:250,000. 1966. Department of the Interior, U.S. Geological Survey, Washington, DC.

57. Aeromagnetic Reconnaissance of the east-central Tanana lowland. Alaska. Map GP-447. Scale 1:250,000. 1964. Department of the Interior, U.S. Geological Survey, Washington, DC.

58. Reconnaissance Geologic Map of the Big Delta C-4 quadrangle, Alaska. Scale 1:63,360. 1977. Department of the Interior, U.S. Geological Survey, Reston, VA.

59. Alaska. 1:50,000 Scale. Series Q701:

    Fairbanks B-3, Sheet 3349 I 1951 Army Map Service, Washington, DC.
    Fairbanks B-4, Sheet 3349 IV 1975 Defense Mapping Agency Topographic Center, Washington, DC.
    Fairbanks D-3, Sheet 3350 I 1975 Defense Mapping Agency Topographic Center, Washington, DC.
    Fairbanks C-3, Sheet 3350 II 1951 Army Map Service, Washington, DC.
    Fairbanks C-4, Sheet 3350 III 1951 Army Map Service, Washington, DC.
    Fairbanks D-4, Sheet 3350 IV 1953 Army Map Service, Washington, DC.
    Fairbanks B-1, Sheet 3449 I 1951 Army Map Service, Washington, DC.
    Fairbanks B-2, Sheet 3449 IV 1951 Army Map Service, Washington, DC.
    Fairbanks D-1, Sheet 3450 I 1975 Defense Mapping Agency Topographic Center, Washington, DC.
    Fairbanks C-1, Sheet 3450 II 1975 Defense Mapping Agency Topographic Center, Washington, DC.
    Fairbanks C-2, Sheet 3450 III 1951 Army Map Service, Washington, DC.
    Fairbanks D-2, Sheet 3450 IV 1951 Army Map Service, Washington, DC.
    Big Delta B-6, Sheet 3549 IV 1951 Army Map Service, Washington, DC.
    Big Delta D-5, Sheet 3550 I 1975 Defense Mapping Agency Topographic Center, Washington, DC.
    Big Delta C-5, Sheet 3550 II 1975 Defense Mapping Agency Topographic Center, Washington, DC.
    Big Delta C-6, Sheet 3550 III 1975 Defense Mapping Agency Topographic Center, Washington, DC.
    Big Delta D-6, Sheet 3550 IV 1975 Defense Mapping Agency Topographic Center, Washington, DC.

60. Big Delta, Alaska, Vegetation. Scale 1:250,000. 1961–64. Series Q501, NQ5, 6-16 Plate 9. Edition 1, Army Map Service, Washington, DC.

61. Fairbanks, Alaska, Vegetation. Scale 1:250,000. 1964. Series Q501. NQ5, 6-15 Plate 10. Edition 2, Army Map Service, Washington, DC.

62. Fairbanks, Alaska, Vegetation (inked cronflex overlays-2). Scale 1:250,000. 1967. Defense Intelligence Agency. Washington, DC. Overlays keyed to U.S. Geological Survey 1:250,000 Scale Maps, 1966.

63. Fairbanks Sectional Aeronautical Chart. Scale 1:500,000. 1977. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Washington, DC.

64. Fairbanks, Alaska. Topographic Series. Scale 1:250,000. 1972. U.S. Geological Survey, Reston, VA.

65. Fort Wainwright Maps. No scale. June 1971. U.S. Army Engineer District, Alaska, Corps of Engineers, Anchorage, AK.

66. Joint Operations Graphic. Scale 1:250,000. 1967. Sheets NQ5, 6-15; 16. The Aeronautical Chart and Information Center, St. Louis Air Station, MO.

67. Operational Navigational Chart. Scale 1:1,000,000. 1970. Sheet C-9. The Aeronautical Chart and Information Center, St. Louis Air Station, MO.

AERIAL PHOTOGRAPHY

68. 1:12,500 Scale. Black and white contact prints (enlarged from 1:25,000 scale photography). July 1972 and September 1974. 172D MID(AS), Fort Wainwright, AK.

69. 1:60,000 Scale. Black and white contact prints. May 1972 and June 1973. U.S. Air Force, Earth Resources Observation System Data Center, Sioux Falls, SD.

70. 1:65,000 Scale (approximately). Color infrared prints. June 1974, June 1977. National Aeronautical and Space Administration, Earth Resources Observation System Data Center, Sioux Falls, SD.

71. 1:130,000 Scale (approximately). Color infrared prints. June 1974, June 1977. National Aeronautical and Space Administration, Earth Resources Observation System Data Center, Sioux Falls, SD.

PERSONAL COMMUNICATIONS ON-POST

72. Mr. G. Brewster. 11–12 September 1978. Operation and General Maintenance Foreman, Directorate of Facilities Engineering, Fort Wainwright, AK. Telephone Communications.

73. Mr. Buska. 2 June 1978. Cold Regions Research & Engineering Laboratories, Fort Wainwright, AK. Personal Interview.

74. Mr. F. Coletta. 2 June 1978. Chief, Buildings and Grounds Division, Directorate of Facilities Engineering, Fort Wainwright, AK. Personal Interview.

75. Mrs. Betty Jones. 1–6 June 1978. Real Property Clerk, Work Management Division, Directorate of Facilities Engineering, Fort Wainwright, AK. Personal Interview.

76. Mr. William Gossweiler. 6 June 1978. Natural Resources Specialist, Directorate of Facilities Engineering, Fort Wainwright, AK. Personal Interview.

77. SP4 Chuck Good. 6 June 1978. Draftsman, 47th Engineering Company, Fort Wainwright, AK. Personnal Interview.

78. SFC R. Harrison. 2 June 1978. Wire Chief, Telephone Exchange, Directorate of Communications – Electronics, Fort Wainwright, AK. Personnal Interview.

79. SFC G. Harris. 2 June 1978. Administration NCO, Family Housing, Directorate of Industrial Operations, Fort Wainwright, AK. Personal Interview.

80. Mr. Thomas Leschorn. June 1977 – June 1978. Directorate of Facilities Engineering, Fort Wainwright, AK. Personal Interviews and Telephone Communications.

81. CPT J. McCabe. 2 June 1978. Directorate of Communications – Electronics, Fort Wainwright AK. Personal Interview.

82. CPT J.H. Rawl. 1 June 1978. Directorate of Plans and Training/Security, Fort Wainwright, AK. Personal Interview.

83. Mr. Ken Swanson. 2 June 1978. Chief, Utilities Division, Directorate of Facilities Engineering, Fort Wainwright, AK. Personal Interview.

84. MAJ West. 1 June 1978. Directorate of Plans and Training/Security, Fort Wainwright, AK. Personal Interview.

85. Mr. Don Wilson, Jr. 2 June and 15 September 1978. Utilities Division, Directorate of Facilities Engineering, Fort Wainwright, AK. Personal Interview.

PERSONAL COMMUNICATIONS OFF-POST

86. Mr. Joe Corazzini. 8–9 June 1978. Directorate of Facilities Engineering, Fort Richardson, AK. Personal Interview.

87. Ms. Sue Fison. 6 June 1978. Director, Community Information Center, Fairbanks, North Star Borough, Fairbanks, AK. Personal Communication.

88. Ms. Colleen Fitzgerald. 1 June 1978. North Star Borough School District, Fairbanks, AK. Telephone Conversation.

89. Mr. Joseph Frizzell. 16 May 1978. Clerk Researcher, Federal Aviation Administration, Office of Airport Programs, Airport Data Branch; Washington, DC. Telephone Conversation.

90. Mr. N.E. Hutchison. 28 December 1977. Assistant Chief, Water Resources Division, U.S. Geological Survey, Reston, VA. Telephone Conversation.

91. Mr. Mark Marcus. 6–9 June 1978. Directorate of Facilities Engineering, Fort Richardson, AK. Personal Interview.

92. Mr. Charles Miller. 29 April 1978. District Engineer, U.S. Army Engineer District, Anchorage, AK. Letter.

93. Mr. Tom Mingen. 18 May 1978. Hospital Administrator, Fairbanks Memorial Hospital, Fairbanks, AK. Telephone Conversation.

94. Mr. Dale Nelson. 7 June 1978. Directorate of Facilities Engineering, Fort Richardson, AK. Personal Interview.

95. Mr. Floyd H. Pattison. 23 May 1978. Acting Chief, Airport Division, Federal Aviation Administration – Alaska Region, Anchorage, AK. Letter.

96. Ms. Laurie Rockstad. 1 June 1978. Research Assistant, Community Information Center, Fairbanks, AK. Telephone Conversation.

97. Mr. George Rolby. 5 June 1978. Program Manager, Aeronautical Information Department, Defense Mapping Agency Aerospace Center, St. Louis Air Force Station, MO. Telephone Conversation.

98. Ms. Janet Scott. 16 May 1978. Service Representative, Municipal Utilities System, Fairbanks, AK. Telephone Conversation.

99. CPT Shaheney. 7–8 June 1978. 172nd Infantry Brigade, Fort Richardson, AK. Personal Interview.

100. Mr. Steven W. Wake. 3 June 1978. National Forest Service, Forest Service Laboratory, Juneau, AK. Personal Communication.

101. Ms. Florence Weber. 2 June 1978. U.S. Geological Survey, Fairbanks, AK. Personal Interview.

102. Ms. Teresa Williams. 18 May 1978. Clerk, North Star School Borough, Fairbanks, AK. Telephone Conversation.

ORGANIZATIONS

103. DOWL (Dickson, Oswald, Walch, Lee) Engineering Company. 7–9 June 1978. Anchorage, AK. Telephone and Personal conversations.

104. U.S. Army Environmental Hygiene Agency. January 1978. Denver, CO. Letter.

105. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Meteorological Research Library. 13 December 1977. Silver Spring, MD. Visit.